VOL. 179 No. 7 AMERICAN DECEMBER 1953

Gas Journal

Promote Your *MRS. AMERICA* CONTEST more effectively!

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JOHN WOOD helps you sell automatic GAS hot water service

If you are planning to tie in with the big AGA traffic-building, sales-making *Mrs. America* Contest, you can get extra benefits by promoting *all* of your gas appliances.

Soon, your John Wood representative will call on you and describe the promotion material now being prepared to help you sell automatic gas water heaters.

You will also be glad to know that prints of "*Servants On Tap*," our 15 minute full color consumer motion picture on water heating, will be made available. Shown before audiences gathered to witness your *Mrs. America* bake-off cooking contests, this movie should help you entertain and educate your guests on the merits of automatic gas hot water service. Send in your reservation for a print of "Servants On Tap" today.

JOHN WOOD COMPANY
HEATER & TANK DIVISION
Conshohocken, Pennsylvania • Chicago, Illinois

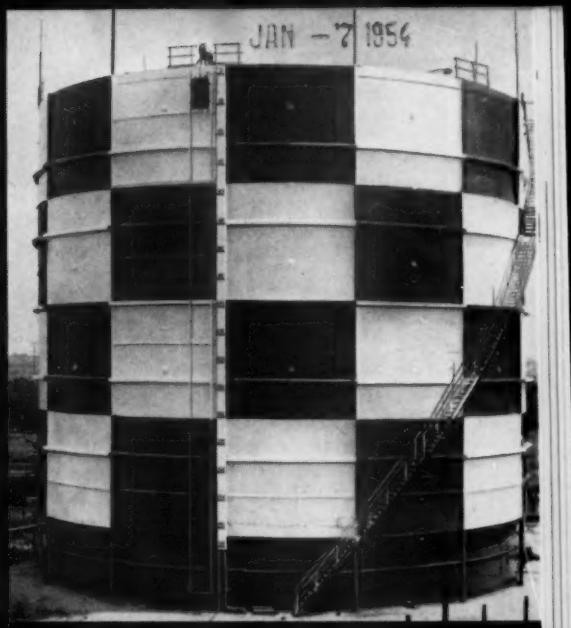
Mrs. America poses with a John Wood Automatic Gas Table-Top water heater in the official *Mrs. America Home* at Ellinor Village, Ormond Beach, Florida.

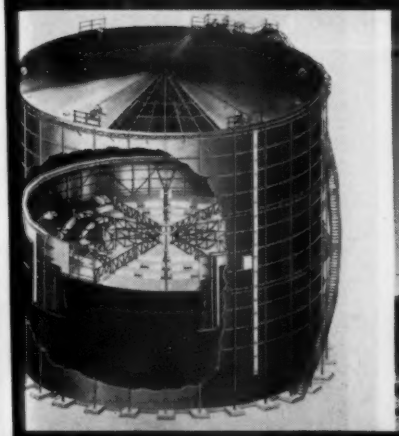
The Season's Best
captan
NATURAL GAS ODORIZING CO., INC.

simple! proved in use!

Wiggins Gasholder

BY GENERAL AMERICAN



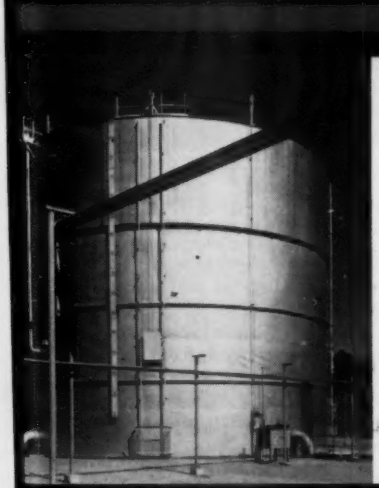


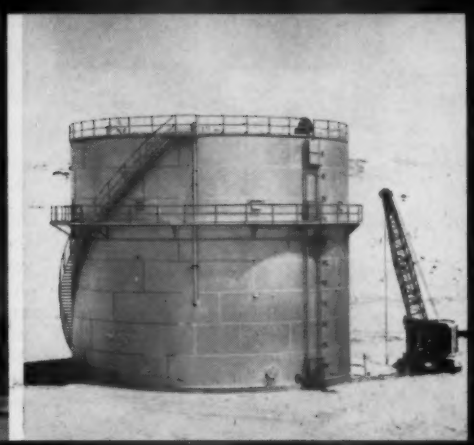
The only gasholder that uses

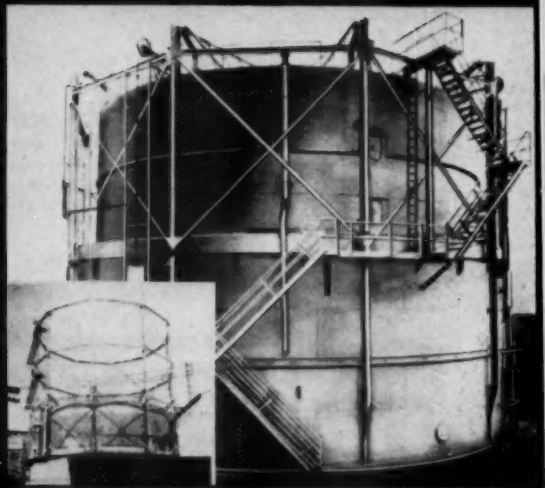
NO WATER
NO TAR
NO GREASE

The only gasholder that assures you

NO WEATHER WORRIES
NO OPERATING COSTS
NO MAINTENANCE PROBLEMS







You can convert your old style gasholders to get the Wiggins advantages

GENERAL AMERICAN

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GENERAL AMERICAN
TRADE MARK

TRANSPORTATION CORPORATION

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Be sure to get the performance record on the only modern gasholder before you plan any gasholder construction.

MUELLER®

HIGH PRESSURE NO-BLO GAS SERVICE EQUIPMENT

In keeping with a policy of constant research and development to meet the demands of the gas industry, the Mueller Co. now produces a complete line of high pressure gas service products — a few of which are shown here. All products are completely tested before leaving the factory and are fully warranted. Consult your Mueller representative or write direct for details.

H-17800 CURB VALVE TEE

Adaptable to any high pressure installation . . . stem insertable under pressure . . . line contact valve . . . . forged steel body . . . high strength silicon bronze stem . . . double "O" ring seals . . . working pressure of 1200 p.s.i.

H-17500 SERVICE TEE

Designed for making service connections under pressure . . . welding and threaded inlets and outlets available . . . plug and cap provide double leakproof seal.

H-17650 SERVICE VALVE TEE

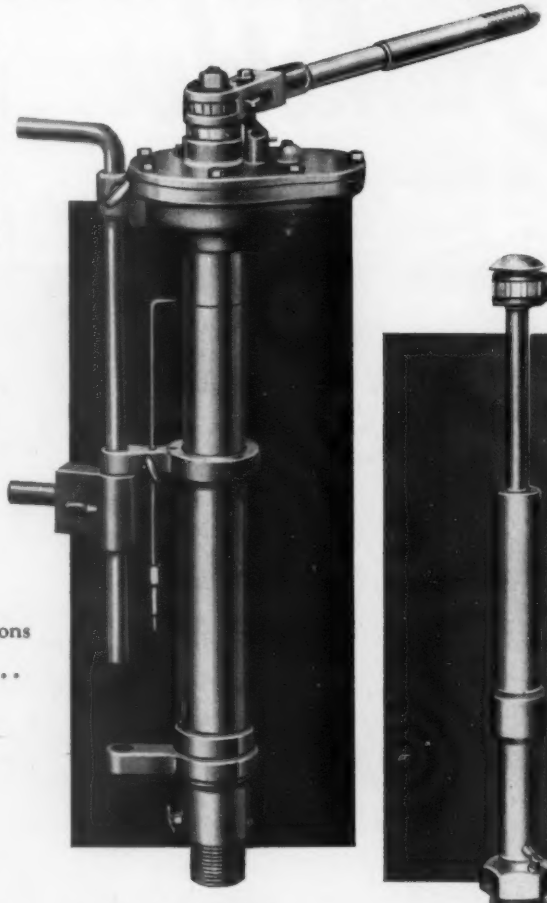
Built-in valve permits operation at any time with screw driver and wrench . . . easily installed under pressure . . . welding or threaded inlets and outlets available.

H-17490 SAVE-A-VALVE DRILLING NIPPLE

Ideal for any temporary or semi-permanent connections . . . inner plug permits removal of valve when abandoning connection . . . plug and cap provide double leakproof seal . . . welding or threaded type available.

H-17150 EXTENSION STOPPER FITTING

Provides for future shut-offs . . . no drilling equipment needed to insert stopper . . . dead end extension and lateral extension types also available.



DH-2 DRILLING MACHINE

Makes cuts from ¼" through 2" under pressure . . . maximum working pressure of 1200 p.s.i. . . . maximum working temperature of 500° F. . . . boring bar travel of 14" . . . hand or power operated.

H-17145 COMPLETION MACHINE

Inserts and extracts valve stems and plugs in curb valve tees, service valve tees, Save-A-Valve drilling nipples and extension stopper fittings . . . maximum working pressure of 1200 p.s.i. . . . balanced pressure construction allows easy hand operation.

NO-BLO

Write for detailed literature on any of these items.

MUELLER CO.

Dependable Since 1857

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AMERICAN Gas Journal
ESTABLISHED 1859

VOLUME 179 DECEMBER 1953 NUMBER 7

This month...

To those readers who responded to our recent questionnaire inquiring their top reading interests in American Gas Journal, we are deeply grateful. It is of interest to record in passing that the return was something in the order of 25%, which is high for these days when everybody and every thing is being surveyed by somebody for some purpose or other.

Modestly, we attribute this to a lively amount of reader interest in our monthly output, and a willingness to be helpful in our future labors. Although there is always the alternate possibility that our respondents sensed the opportunity to point out the possibilities for needed improvement.

In order of their stated first choice of subjects, we found that Gas Distribution, won hands down; with Gas Transmission, and Customer Relations and Service, tied for second place. Next in line, in the following succession, were: Gas Plant Operation, Appliance Merchandising, American Gas Fundamentals, Industrial Utilization, Editorial Page, Legal Articles and the Financial Page.

Of those who stated a magazine preference, 71% voted for the Journal; an expression we are inclined to suspect more indicative of good will than of profound disinterested appraisal. But none the less encouraging too, in its way.

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Hilding H. Carlson · Managing Editor
Bernard W. Morris · News Editor
Charles R. Bellamy · Technical Editor
Arthur Rohman · Western Editor **John F. Falvey · Financial Editor**

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October 1 Handbook issue not sold separately.

Research and Development bring you this finer-than-ever pipe

You can't better a product like cast iron pressure pipe—with its unparalleled record of long life, economy and efficiency—by waving a wand. Yet the story of how the best product in its field has been made *still better* can be told in a paragraph.

Modernized **cast iron pipe is a result of the sum total of recent product and process improvements attained by research and development.**

It is centrifugally-cast and has standardized mechanical joints that are bottle-tight for all approved working pressures and all types of gas. It is tougher, stronger, more uniform in quality.

If you want the most efficient and economical pipe ever made for gas distribution, your new mains will be laid with cast iron pipe—centrifugally cast and with standardized mechanical joints. Cast Iron Pipe Research Association, Thos. F. Wolfe, Managing Director, 122 So. Michigan Ave., Chicago 3.

This cast iron gas main, uncovered for inspection, is in fine condition after over a century of service in Philadelphia, Pa. —one of more than 45 cities with century-old gas or water mains in service.

Modernized **cast iron**

CAST Q IRON

The Q-Check stencilled on pipe is the Registered Service Mark of the Cast Iron Pipe Research Association.

pipe for Modern Gas Distribution

SIMPLE MAINTENANCE OPERATING HINTS FOR YOUR MUELLER "C-C" AND "C-I" DRILLING MACHINES!

SIMPLE MAINTENANCE

Maintenance has been reduced to a minimum on the Mueller "C-C" and "C-I" Drilling Machines. All working parts are totally enclosed in an oil-filled aluminum case. This provides positive lubrication and protects machined surfaces from dirt and other foreign material.

Consequently, the only maintenance necessary on the "C-C" and "C-I" is an occasional oil change and addition of new packing material. The step-by-step procedure shown illustrates these simple operations.

STEP 1. DRAIN OLD GEAR OIL.

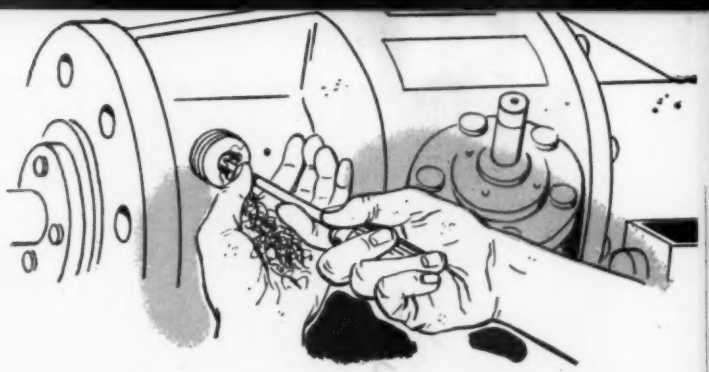
REMOVE FRONT AND REAR OIL PLUGS AND ALLOW OLD OIL TO DRAIN COMPLETELY.

STEP 2. ADD NEW GEAR OIL.

REFILL WITH A GOOD GRADE, EXTREME PRESSURE, SEMI-FLUID GEAR OIL WITH A SAYBOLT UNIVERSAL VISCOSITY OF 200 SECONDS AT 210°F. ADD FIVE POUNDS IN FRONT CASE AND TWO POUNDS IN REAR CASE. REPLACE OIL PLUGS. (NOTE: WHEN USING MACHINE AT TEMPERATURES BELOW 0° FAHRENHEIT, DRAIN 1 PINT OF GEAR OIL FROM FRONT CASE AND REPLACE WITH KEROSENE. USE ½ PINT OF KEROSENE IN REAR CASE.)

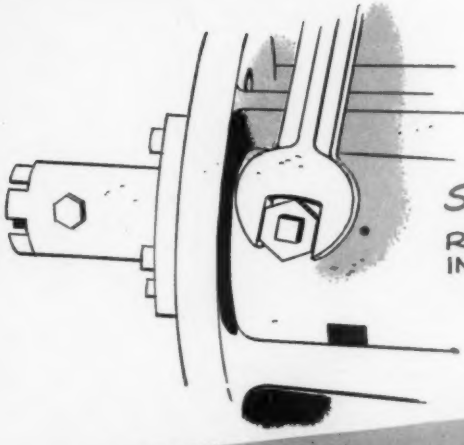
STEP 3. REMOVE PACKING SCREWS.

BACK OUT BORING BAR PACKING SCREWS IN CAPS AND REMOVE CAPS FROM BODY OF MACHINE.



STEP 4. ADD NEW PACKING.

FILL PACKING SCREW HOLES WITH LOOSE PACKING AVAILABLE FROM MUELLER CO.



STEP 5. REPLACE PACKING CAPS.

REPLACE CAPS ON BODY OF MACHINE. INSERT AND TIGHTEN PACKING SCREWS.

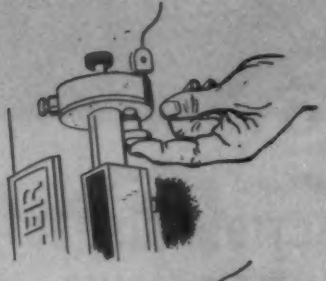
USEFUL OPERATING HINTS

Before each cut:

(a) Touch up shell cutters with oilstone. (If very dull, grind in flutes with thin emery wheel or return to Mueller Co. for reconditioning. Caution: Grind only leading edges of teeth in the flutes.)

(b) Coat shell cutter thoroughly with Mueller cutting grease.

(c) Advance boring bar – by hand – until pilot drill strikes main. Back off ½ turn and engage automatic feed mechanism.



Making cut:

(a) After engaging automatic feed, start machine and run at full throttle immediately.

(b) Packing may be tightened during cut.

(c) Make sure air motor or gasoline drive unit is running at full governed speed.

At end of cut:

(a) Check completion of cut by manually advancing cutter. (Drive unit will pick up speed when cut is completed.)

(b) Do not over-travel machine. Watch limit indicator mark on boring bar.

(c) Remove pilot drill, cutter hub, cutter and coupon from machine as a single unit.

MUELLER NO-BLO **Method**

MUELLER CO.

Dependable Since 1857

MAIN OFFICE & FACTORY DECATUR, ILLINOIS

Photo Courtesy Niagara Mohawk Power Corporation

United's CONSTRUCTION INSPECTION SERVICE FOR PIPE LINES AND DISTRIBUTION MAINS can supplement your forces

Through United Engineers' **construction inspection service for pipe lines and distribution mains,** you can economically supplement your own distribution department's forces. This service is designed to augment your forces during the most active parts of your construction program. It assists in bringing to your organization the latest techniques and methods of construction. It gives you assurance that the work will be carried out in accordance with the specifications and your high standards of security and safety.

Qualified men of long experience are available either as specialists for any particular phase of the work or for the entire field construction. In addition to being qualified technically for their work, they are experienced in handling and taking part in large construction operations. Our current program includes cross country pipe lines, river and water crossings, city street work and gas distribution mains.

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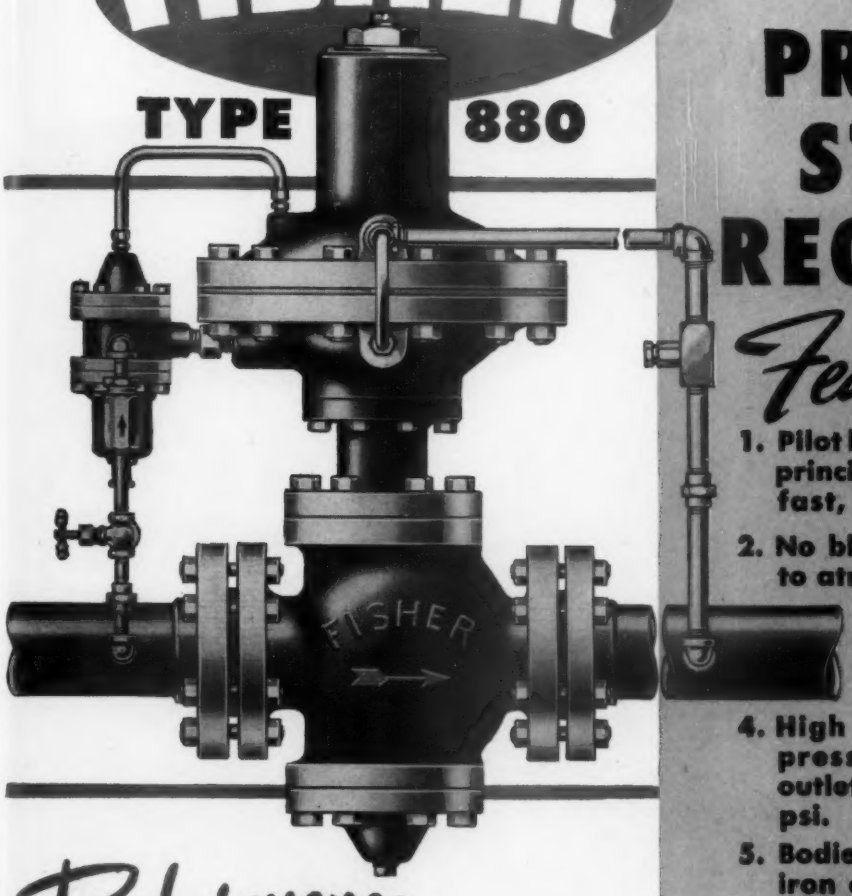
WITH A BACKGROUND OF OVER SEVENTY YEARS' EXPERIENCE

FISHER®

TYPE 880



HIGH PRESSURE STATION REGULATOR

Features

1. Pilot loading pressure balanced principle of operation develops fast, accurate, stable control.
2. No bleed of pilot loading gas to atmosphere.
3. Up to 2" inner valve travel for extreme high capacity requirements.
4. High rangeability with inlet pressures up to 600 psi and outlet pressures from 1 to 250 psi.
5. Bodies available in high-tensile iron or cast steel in sizes 2" to 10".
6. Unit available with top and bottom guided inner valve for severe pressure conditions, or composition "O" ring disc inner valve for absolute tight shut-off.
7. Spring closed construction insures positive inner valve action under all conditions.

The Fisher "880" employs a well proven method of pilot loading and pressure balancing a large spring loaded main diaphragm. Insures positive positioning of main valve in accordance with flow changes and assures accurate control of the reduced pressure in a stable and non-pulsating manner.

Performance

The Fisher Type 880 is an ideal town and border station regulator that promotes precise and stable metering.
It will be found of great value for high pressure loop lines and high pressure distribution stations where dependability is absolutely essential. Bleeds no gas to the atmosphere, can be installed in pits or other locations subject to flooding by venting breather opening of pilot diaphragm to a level above flood stage.

Loading Pilot

Sturdy compact Type 62 loading pilot is the same that has been used for years on the famous Fisher King Booster.

WRITE FOR BULLETIN—P880

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FISHER GOVERNOR COMPANY, Marshalltown, Iowa

LEADS THE INDUSTRY IN RESEARCH FOR BETTER GAS PRESSURE CONTROL

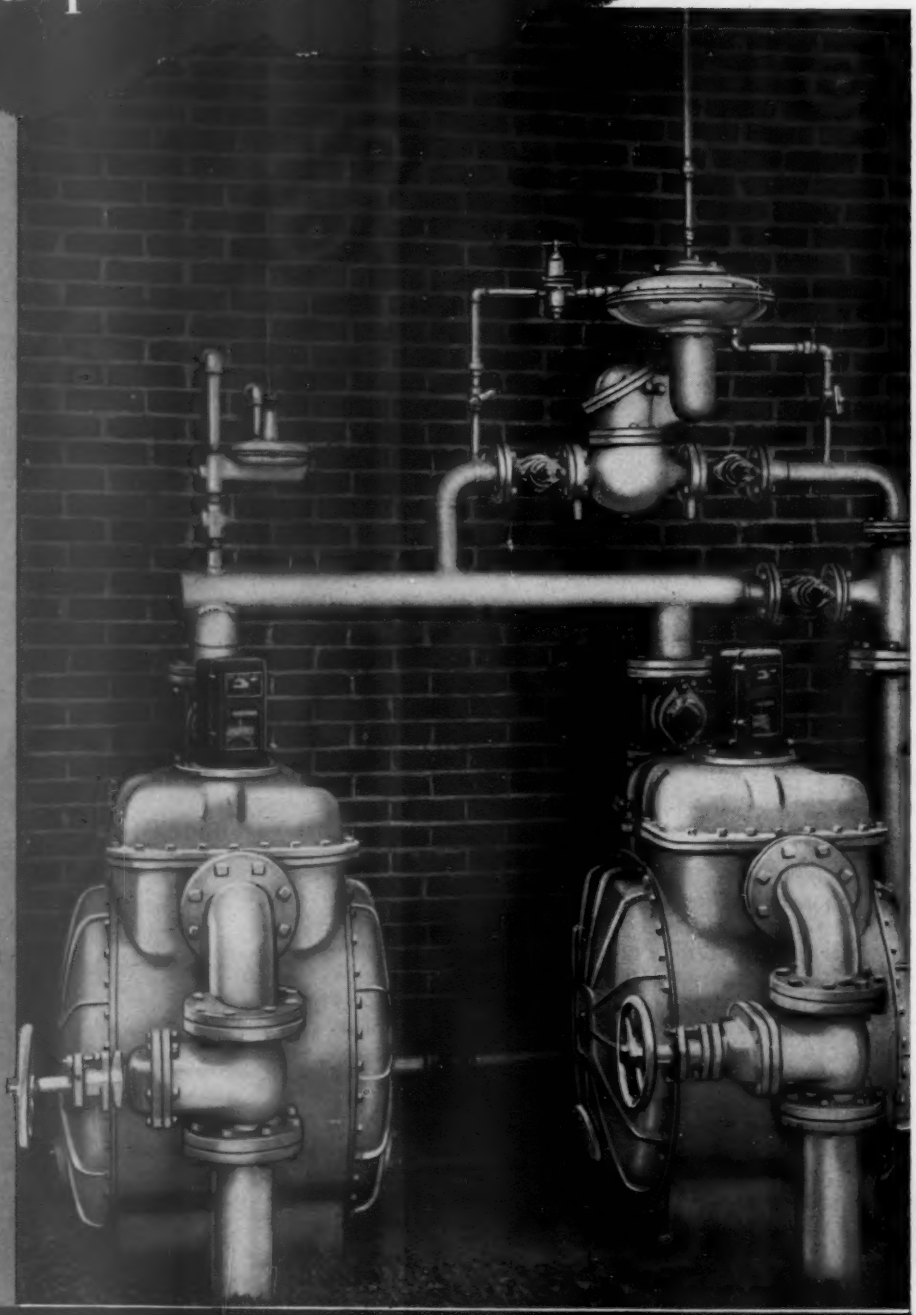
TRIPLE ASSURANCE
of accurate measurement and dependable regulation

AMERICAN® IRONCASE METERS

RELIANCE REGULATORS

AMERICAN BASE PRESSURE INDEXES

American 500B Ironcase Meters measure gas in this high pressure industrial installation and Base Pressure Indexes indicate the gas quantities, computed to base pressure conditions, totalized on a counter. A Reliance CBV Regulator, pilot-loaded with a Type Z Regulator, controls main pressure while a Reliance Service Regulator provides a separate connection.



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AMERICAN METER CO EST 1836 MEASUREMENT

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"SALES CLINCHERS" FOR GAS RANGE SALESMEN

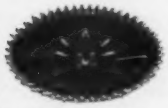
No. 4 of a series

To sell her the *GAS* range, show her how she *SAVES* healthful food values with the...

ALLTROL® *Center Simmer*

When cooking with a small amount of water, you save approximately 13% more minerals and 21% more vitamins than if food were submerged and excess water poured away. But using a little water requires a small amount of *measured* heat to prevent boiling dry. The Alltrol Center Simmer* has a perfect low heat range to provide healthful, appetizing foods for *every* meal.

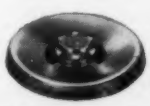
ONLY ALLTROL BURNERS HAVE A *COMPLETE* HEAT CYCLE



Full flame Starting Burner for quick boil or fast frying.

A full range of intermediate heats when wide spread of heat is needed.

Click... here's efficient "Center Simmer" that maintains boiling in any covered vessel.



Click... a gentle "Keep Warm" heat... without further cooking.

*Write for names of ranges featuring ALLTROL Center Simmer.

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ALLTROL® CENTER SIMMER

Chaplin-Fulton

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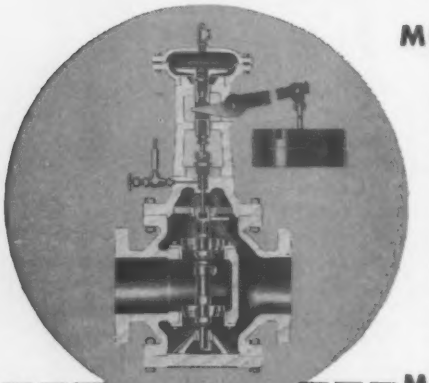
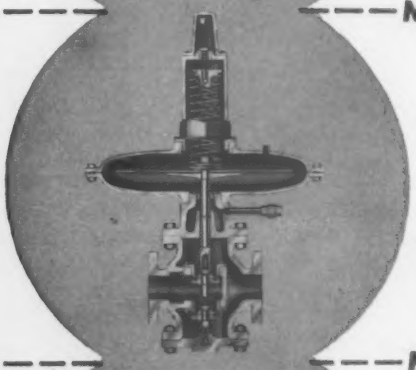
a complete line for every requirement



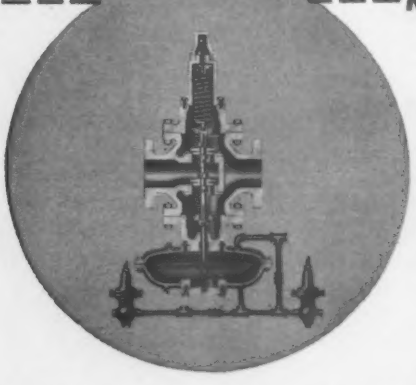
MODEL 44
Weight and Lever Loaded

For general pressure reduction service. Sizes 2″-12″ standard, 16″-24″ special. Flanged body assemblies in cast iron for 100 lb. or 600 lb. W.P.—cast steel for 1200 lb. W. P. Controlled Pressure Range—ounces to 200 lbs. All flanged construction—lubricated stuffing boxes—removable orifices—balanced valve assemblies interchangeable—hard seat, soft seat or reduced size—all center guided.



MODEL 44 S
Spring Loaded

A dependable, accurate regulator for distribution service, large industrial or commercial applications, boilers, industrial furnaces, dehydrators, etc. Sizes 2″-6″, flanged F&D 125 lb. body assembly for 100 lb. W. P. Controlled Pressure Range—ounces to 50 lbs. Can be furnished as zero governor. Removable orifices, soft seat balanced valve construction, easily adjustable and removable. Springs colored for identification.



MODEL 44 PC
Pilot Loaded

An accurate efficient pressure loaded regulator for high or low pressure service. Town border settings, compressor fuel lines, transmission measuring stations, large industrial installations. Sizes 2″-12″, flanged for 100 lb., 600 lb., or 1200 lb. W. P. Controlled Pressure Range—ounces to 400 lbs. All flanged construction. MODEL 44 PC—closes on pilot pressure failure. MODEL 44 PO—opens on pilot failure.

OTHER BALANCED VALVE TYPES

Model 44D Duplex Gas Regulators
Model 44B Back Pressure Regulators
Model 44 Diaphragm Motor Valves
Model 46 Industrial Furnace Regulators
SENSITROL Pilot Loading Systems

SINGLE SEAT REGULATORS

Little Hercules High Pressure
H. P. Field Regulator Type 101
House Regulators with Cut-off
H. P. Spring Field Type 149
Dead Weight Pressure Regulators
C-F Type 250 Safety Valves

LONG IN OPERATION • LOW IN MAINTENANCE

ACCURATE ***DEPENDABLE***

Chaplin-Fulton
MANUFACTURING COMPANY
Pittsburgh 25, Pennsylvania

Editorial:

New Language Needed

THE final blow to the hopes of those who had expected the ambiguities of the Natural Gas Act to be cleared up by court decision has been dealt by the action of the Supreme Court in refusing to hear an appeal from the ruling of the U.S. Circuit Court of Appeals in the Phillips Petroleum case. In effect this action now compels the Federal Power Commission to fix the rates of natural gas producers and gatherers and effectively negates Congressional intent, as written into Section 1(b) of the Natural Gas Act, which said that its provisions should "not apply to the facilities used for distribution or to the production and gathering of natural gas."

The truth of the matter is that natural gas producers have never known with anything like certainty just where they stood under the Natural Gas Act. Early in its enforcement, it became apparent that what looked to the layman like a plain limitation on Federal powers was only a spring-board for FPC excursions into aspects of regulation that Congress had denied it.

In 1940, two years after the passage of the Natural Gas Act, FPC in the Columbian Fuel case disclaimed all jurisdiction over the producers' field prices, as coming under production and gathering. Then in 1945, in the Colorado Interstate case, it adopted the principle of including gas reserves owned by natural gas companies in the rate base of those companies, allowing only a 6% return on the depreciated cost of such reserves. Later in the Interstate Natural case, the Commission took jurisdiction over the field price a natural gas company could charge for gas sold to another natural gas company for interstate movement.

In all of these actions, however, FPC disclaimed jurisdiction over independent producers of natural gas and, in its Order 139, issued in August 1947, it categorically asserted that it would not attempt to exercise such jurisdiction.

No sooner had the Kerr bill been vetoed by President Truman, in 1950 than the Commission formally rescinded its Order 139, although it stated at the time that "it is not the intention of the Commission to inaugurate a general investigation respecting rates charged by independent producers and gatherers."

In August, 1951, the Commission reaffirmed this intention by deciding (4-to-1) that it had no jurisdiction to rule on the prices of sales by Phillips Petroleum Company to the various pipeline companies that it serves. The State of Wisconsin took the lead in appealing the decision to the courts, however, and the recent Supreme Court ruling now saddles FPC with the responsibility that it first tried to assume, then repudiated, then reasserted and again disclaimed; that of fixing rates of natural gas producers and gatherers.

It is idle now to argue further whether or not the control of producers' field prices is contrary to the intent of Congress as expressed in the Natural Gas Act. The Supreme Court has spoken, and the only recourse is for the Congress to now restate its intentions, and if such a thing is possible, restate them in words that will leave no room for equivocation or doubt.

If the Federal Power Commission is to exercise jurisdiction over the rate paid to independent producers, it cannot stop with fixing rates for Phillips Petroleum Company. While Phillips is the largest, and consequently the most conspicuous target for field price regulation, it is only one of 5,000 individual units engaged in the gas producing business, according to Hines H. Baker, President of Humble Oil and Refining, in a recent address before the American Gas Association. If it is to administer the Natural Gas Act, as now defined, impartially and equitably, FPC will have to set up a complete study of field production and gathering operations of all the producers now coming under its jurisdiction.

Some standard of return, never heretofore contemplated, will have to be devised, a task which the Commission now has neither the desire nor the manpower to undertake. The moot question of how *any* limitation on rate of return can be set on such a highly speculative business as oil and gas drilling and recovery remains unanswered. Certainly with a record of eight dry holes drilled for every one discovering gas or oil, the producing industry will not proceed in its search for natural gas for the privilege of earning a 6% return on only the producers. The risks are too great for venture capital to be interested in such a paltry return on successful wells, with the unsuccessful ones written off as a dead loss.

To the distributing gas utilities it may appear, as it undoubtedly does appear to the State of Wisconsin, that regulated field prices will mean cheaper city gas rates. But if such regulation results in a slackening in the search for new reserves, or in a contraction of the reserves available to the natural gas lines from oil companies, it can only mean cheaper gas today at the expense of economical rates in the near future.

The solution of the problem is now in the laps of the Congress. It should proceed forthwith to enact legislation expressly preventing the Federal Power Commission from regulating the production and gathering of natural gas, fixing the prices at which the producer or gatherer may sell his gas to a natural gas company, or requiring a natural gas company to value its own production at less than the fair field or market price.

That, we are convinced, was Congressional intent in 1938 when the Natural Gas Act was passed. If it is Congressional intent today, then that body should say so in language that both the Federal Power Commission and the Supreme Court can interpret and understand.

Elliott Taylor

How Peak Shaving Provides Benefits For Natural Gas Distribution Systems

by Charles T. Chave and Bradford C. White

Assistant Chief Engineer — Engineer

Badger Process Division

Stone & Webster Engineering Corporation

THE need for peak shaving facilities on a manufactured gas system is fairly obvious—they keep down the size of the gas generating plant. The gasholder is the simplest device for peak shaving. In competition with gas storage facilities are propane-air sendout plants, oil gas sets and oil reforming units. Usually, a natural gas distribution system has no manufacturing facilities; the demand charge by the transmission pipeline company is the driving force for peak shaving on such a system.

The two-part rate, with a demand charge and a commodity charge, is not a thing of perfection. Nevertheless, it is a great economic concept, working in the direction of the most efficient use of transmission lines and the lowest delivered price for natural gas. It is an attempt to separate fixed charges on the transmission system and operating costs of supplying the gas.

When a customer even momentarily demands firm gas at a certain rate, he is asking that a portion of the gas transmission system be reserved for his use. It is logical that he should pay for this privilege, regardless of how much total gas he uses. The only questions unsettled are how much of the transmission facilities he is tying up, and how much he should pay.

Two-part rates vary with different gas transmission companies and with customers, depending to a great extent where deliveries are made from the pipeline and how their demands affect system load factor. The following rates are typical:

	Monthly Demand Charge Per max daily Mcf	*Commodity Per Mcf*
New England	$4.50	$0.30
Middle Atlantic	2.60	0.257
Northwest (Proposed)	3.20	0.20
Southern California	1.60	0.16

The economics of peak shaving depends on these rates; peak shaving would be of no value for only a commodity rate basis of billing. It also depends upon the load curve for the distribution system. Obviously, the miracle-system with 100% load factor gains nothing from peak shaving, while a system having only one high peak day a year can spend a substantial sum to reduce this peak.

The results of the application of two-part rates, in terms of actual cost of gas furnished during peak periods, show figures of $2, $3 or even $20 per Mcf.

Cooking habits vary but little from day to day, so that daily load factor is not seriously affected. Space heating is the principal contributor to fluctuating load, and that variable weather is the controlling cause.

Effect of weather pattern

The accompanying Figure 1 shows the weather patterns for four cities, in temperature variation curves.

There may be no snow in Tacoma, but the horrible day at the end of January with about 25°F mean temperature would be costly for the gas company.

In Boston, for which the average temperature variation curve covers fifty years, the weather extremes are hotter in Summer and colder in Winter than for Tacoma. However, the sharp winter peaks are not much worse than for Tacoma; in January in Boston there is a peak about 27°F below the average, while in Tacoma it is about 17°F.

Very little can be done about the difference between Summer and Winter loads by peak shaving, but the daily peaks can be reduced.

The steadiness of the climate in San Francisco is striking, and the two winter peaks of consequence, in the temperature variation curve, are only about 5-to-7°F below the average January-and-February weather.

Figure 1

WEATHER PATTERNS OF FOUR LARGE CITIES

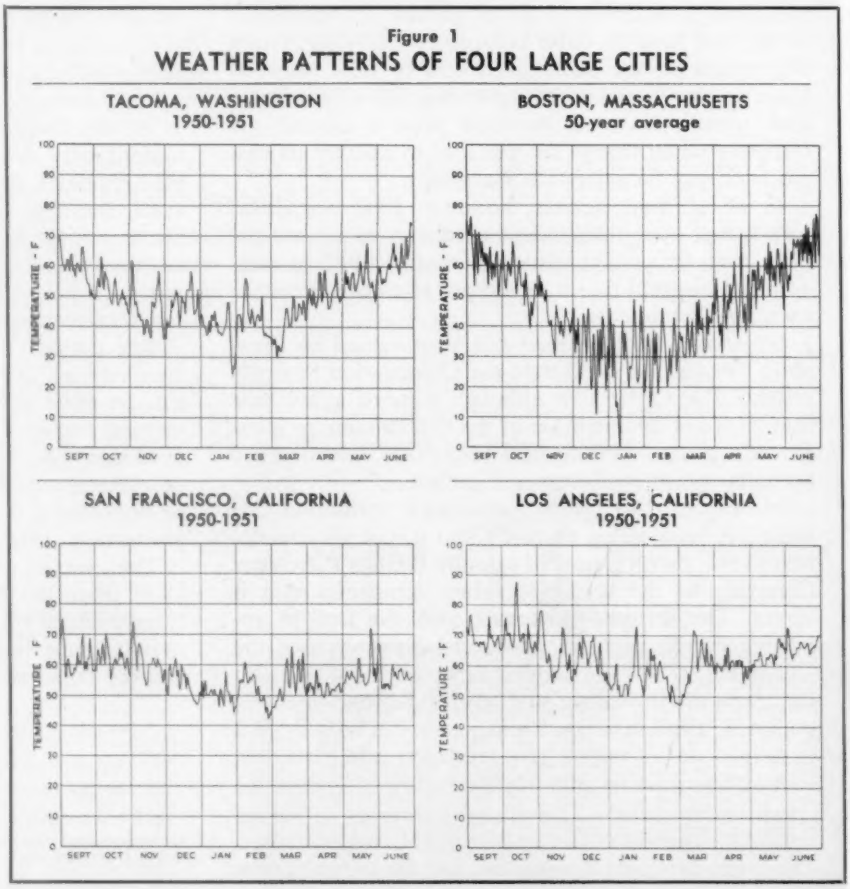
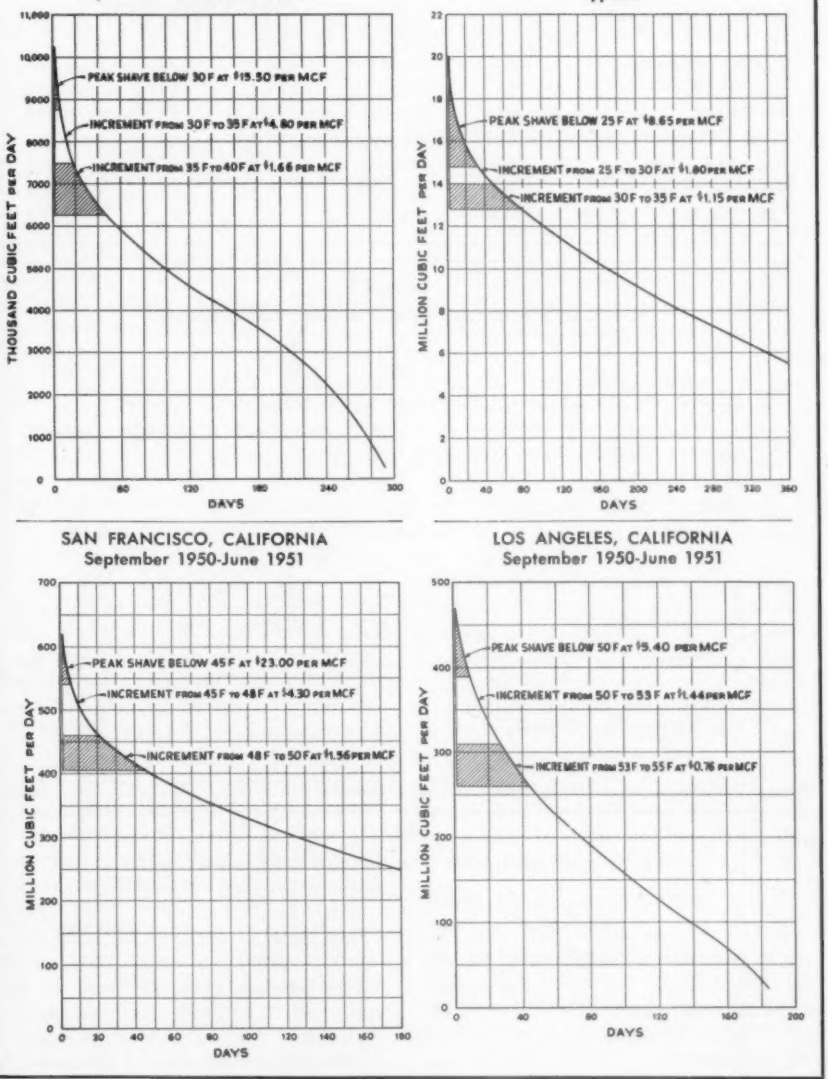


Figure 2

LOAD DURATION CURVES FOR FOUR LARGE CITIES


TACOMA, WASHINGTON
September 1950-June 1951
PEAK SHAVE BELOW 30 F AT $15.50 PER MCF
INCREMENT FROM 30 F TO 35 F AT $4.80 PER MCF
INCREMENT FROM 35 F TO 40 F AT $1.66 PER MCF
THOUSAND CUBIC FEET PER DAY
DAYS
BOSTON, MASSACHUSETTS
Typical
PEAK SHAVE BELOW 25 F AT $8.65 PER MCF
INCREMENT FROM 25 F TO 30 F AT $1.80 PER MCF
INCREMENT FROM 30 F TO 35 F AT $1.15 PER MCF
MILLION CUBIC FEET PER DAY
DAYS
SAN FRANCISCO, CALIFORNIA
September 1950-June 1951
PEAK SHAVE BELOW 45 F AT $23.00 PER MCF
INCREMENT FROM 45 F TO 48 F AT $4.30 PER MCF
INCREMENT FROM 48 F TO 50 F AT $1.56 PER MCF
MILLION CUBIC FEET PER DAY
DAYS
LOS ANGELES, CALIFORNIA
September 1950-June 1951
PEAK SHAVE BELOW 50 F AT $5.40 PER MCF
INCREMENT FROM 50 F TO 53 F AT $1.44 PER MCF
INCREMENT FROM 53 F TO 55 F AT $0.76 PER MCF
MILLION CUBIC FEET PER DAY
DAYS

In Los Angeles, the weather pattern includes a series of peaks, again about 7-to-10°F below the average for January and February, with rather broad bases. Shaving these peaks to the average would take a lot of gas, as compared with the narrow peak for Tacoma.

The rate of heating gas sendout has almost a straight-line relationship to the daily mean temperature. For any system, there is an Mcf-per-day requirement for each degree below the base temperature. Once the weather pattern for a locality is established, this number may be readily obtained from gas company records, and a load variation curve plotted.

Those curves indicate the number of peaks, their extent and their duration. For this purpose, temperature and load duration curves are more useful than curves of sendout rate plotted on calendar time. In these duration curves, the peaks are all plotted next to each other in descending order of size.

Load duration curves, developed from typical data for the four cities and corresponding to the temperature variation curves in Figure 1, are shown in Figure 2. The cost data result from applying the rates cited earlier. Note that the area under the curve represents the total Mcf of gas sent out. For example, in the duration curve for Tacoma, it is only the small shaded peak at the left of the curve which is susceptible to peak shaving.

By applying suitable two-part rate charges to the gas in these peaks, the costs can be seen and thereby it can be judged whether peak shaving gas can be sent out for less money.

The very tip of the Tacoma peak would cost $15.50 per Mcf, with a total sendout of 3,750 Mcf. This is for peak shaving below 30°F. The next increment from 30-to-35°F, representing 10,000 Mcf, would cost $4.80 per Mcf. Finally, the large area from 35-to-40°F, representing 34,100 Mcf, would cost $1.66 per Mcf.

The problem is to match up these volumes of gas with the same volumes of peak shaving gas at less cost.

For comparison with the West Coast cities, the very tip of the Boston peak would cost $8.65 per Mcf, with a total sendout of 32,400 Mcf, for peak shaving below 25°F. The next increment, from 25-to-30°F, representing 43,000 Mcf, would cost $1.80 per Mcf. Finally, the increment from 30-to-35°F, representing 63,300 Mcf, would cost $1.15 per Mcf.

Figure 7 includes curves giving the costs of peak gas in all these localities versus the total amount of gas used.

Peak shaving may be accomplished in two ways: maunfacturing a gas cheaper than the cost of the peak gas, or storing gas for release in peak periods.

In the case of manufacturing for a natural gas system, the gas produced must have a heating value somewhere in line with natural gas. This eliminates water gas and coke oven gas from consideration and limits consideration to cracking liquid fuel by reforming or using oil gas sets.

The cost of gas made by such cracking depends on the cost of the feed stock, its heating value, and the conversion efficiency of the process. In reforming propane to 1,000 Btu per Mcf, the cost of liquid fuel per Mcf of gas is developed as follows:

where E is the conversion efficiency—

$$\frac{\text{¢ per gal}}{\text{E x 92,000 Btu/gal}} = \text{¢ per Btu}$$

$$\text{¢ per cf} = \frac{\text{Btu}}{\text{cf}} \times \frac{\text{¢}}{\text{Btu}} = 1{,}000 \times \frac{\text{¢}}{\text{Btu}}$$

$$\text{¢ per Mcf} = 1{,}000{,}000 \times \frac{\text{¢}}{\text{Btu}}$$

$$\text{¢ per Mcf} = \text{¢/gal} \times \frac{1{,}000{,}000}{92{,}000 \times \text{E}}$$

$$\text{At 10¢ per gal, cost per Mcf} = \frac{\$1.085}{\text{E}}$$

In reforming, the liquid fuel is cracked thermally or catalytically into hydrogen and other lower molecular weight hydrocarbons; steam and air are sometimes added. The efficiency depends on the fuel, the heating value of the gas produced and the process. The approximate conversion efficiencies of some processes and the fuel cost for gas are shown in Table 1.

The investment cost for such a plant is always higher than the cost of a propane-air plant, although labor charges are similar. It is evident from this that

reforming cannot compete with propane-air for peak shaving on a natural gas system.

It has its place, however, in a mixed gas system using propane for peak shaving. On such systems, propane interchangeability is strictly limited because of its different burning characteristic. By reforming, fast-burning hydrogen can be made which, when mixed with propane-air, produces a gas of suitable burning characteristics.

Oil gas can be made as a peak shaving gas in new or converted water gas sets. This is a common practice when natural gas is first brought to an existing distributor. In converting water gas sets to oil gas operation, the capacity will be increased about as follows:

Light oil, single generator—16.7%
Light oil, twin generator—66.7%
Heavy oil, twin generator— 8.3%

In addition, there is a benefit obtained since the oil gas has a higher heating value than the original water gas. Details of the cost of oil gas from light oil are in Table 2; cost of oil gas from heavy oil, in Table 3.

In addition to the costs given in these tables an annual labor cost of $7 per Mcf of daily capacity should be added.

For the heavy oil conversion, it is commonly found that the cost of additional equipment required over and above that needed for the use of light oil generally increases capital charges more than enough to offset the reduced cost of fuel when such an installation is used principally for peak shaving. It should also be borne in mind that the heavy oil gas process is not as flexible as some others.

Propane storage

Turning from manufacturing to storage, the old stand-by is propane. It has one drawback—interchangeability. Propane, to burn successfully on a gas range, which also can burn natural gas, must be mixed with air. Even then it behaves differently from methane, and hence can not usually be substituted 100% due to the range of appliance adjustments. However, the interchangeability depends on the appliance adjustment and, under some circumstances, it may be substituted 100% for a natural gas mix. Interchangeability of propane-air mixes is a maximum at heating values between 1,350 and 1,450 Btu per scf.

The limits of interchangeability and substitutability of various propane mixes with 1,050 Btu high methane natural gas are shown in Figure 3.

For low pressure systems, it is not necessary to provide air compressors to supply the diluent air. By vaporizing the propane at 60 psi or more, jet compressors may be utilized against back pressures as high as 2 psig.

For higher distribution system pressures, air compressors would be required. The horsepower and equipment costs will vary with the hourly capacity sendout pressure and heating value of the propane-air mix. If the sendout pressure is high, consideration should be given to designing the plant for operation on the highest heating value mixture possible at maximum plant capacity. This would permit reduction of the compressor horsepower installed and thereby reduce the capital charges. Of course, operation at this higher heating value would entail some metering loss which should be recognized in any economic evaluation.

(Continued on page 34)

Table 1

FUEL COSTS OF REFORMED GASES

Process	Reformed Gas (Btu/cf)	Feed Stock	San Francisco Area (¢/gal)	Conversion Efficiency (%)	Fuel Cost of Gas ($/Mcf)
Koppers-Hasche	1,000	Naphtha	17.3	98	1.36
UGI-CCR	233	Naphtha	17.3	81	0.383
UGI-CCR	533	Kerosene	15.6	75	0.816
UGI-CCR	689	Kerosene	15.6	65	1.22
Surface Combustion	540	Propane	6.9	74.5	0.544
Gas Machinery Co.	1,000	Propane	6.9	93	0.806
Gas Machinery Co.	1,000	Butane	8.9	91.3	0.903

Table 2

UNIT COSTS AND RATES FOR OIL GAS FROM LIGHT OIL

	Unit Cost	Per Mcf		Cost Per Mcf
Gas Oil (No. 2)/Gal	$0.10075	——		——
Tar/Gal	.05	——		——
Steam/1,000 Lb	.70	——		——
Light Oil/Gal	.056	——		——
Heat and Make Oil	——	14 Gal		$1.410
Total Steam	——	139 Lb		0.097
				$1.507
Residual Tar	——	2.32 Gal	$0.116	——
Residual Light Oil	——	0.40 Gal	0.022	——
				0.138
				$1.369
Purification, Maintenance				0.025
				$1.394

Table 3

UNIT COST AND RATES FOR OIL GAS FROM HEAVY OIL

	Unit Cost	Per Mcf		Cost Per Mcf
Bunker "C" Oil/Gal	$0.05	——		——
Tar/Gal	.05	——		——
Steam/1,000 Lb	.70	——		——
Light Oil/Gal	.056	——		——
Heat Tar	——	.68 Gal		$0.034
Make Oil	——	11.33 Gal		.567
Total Steam	——	117 Lb		.082
				$ .683
Residual Tar	——	2.83 Gal	$0.141	——
Light Oil	——	0.40 Gal	0.022	——
				.163
				$0.520
Purification, Maintenance				.025
Use $0.55 per Mcf of 1,000 Btu Gas				$0.545

Gas Dispatchers Meet and Master Full Range of Delivery Problems

by S. A. Chadwell
Chief System Gas Dispatcher
Columbia Gas System Service Corporation

THE nature of a network dispatching organization depends on the extent of the utility-operation and the scope of the department's activities. It must consist, at least, of a supervisor and a sufficient number of trained dispatchers to work around the clock. It is most desirable that the dispatchers be enrolled from the operating personnel, preferably with some knowledge of the transmission system. The dispatcher should possess a personality that will demand the respect of those with whom he confers. He must be cool and collected under the most extreme emergencies, and he must have the ability to quickly visualize and analyze occurrences even though they have never previously come to his attention. He must be able to clearly express his thoughts under the most adverse conditions. He must have the ability and ambition to learn the many intricacies of the transmission system, the requirements of the various markets and the names and locations of personnel who may be called upon to act during an emergency. He must be resigned to working nights, holidays and weekends and be ready to respond to call for special duty.

The chief dispatcher, in addition to having these requisites, should be capable of supervising his own personnel and directing the activities of members of other departments upon whom he must depend to accomplish his objectives of dispatching. He must conduct his personal activities so that he may be ready to respond to call at all times.

Training

Job requirements make it prohibitive for a school to turn out dispatchers as such, but there are many schools that can furnish prospects with a desirable background. Too often an engineer with a college degree when assigned to dispatching becomes restless during the long period necessary for him to reach a place in the organization that will satisfy his ambition. The unpleasant hours and working conditions also lend to his restlessness. This situation should be given careful thought when considering candidates for the position.

A well planned training course should be designed around the company's operations. A very effective method of study is to establish hypothetical cases of compressor and pipeline failures, balancing of compressor loads, estimating requirements, flexibility of the transmission system and all the phases of the operations with which he might become involved. Some companies have included brief training to improve telephone conversation and radio procedure. This is particularly important since it is the only means of contact he has with many of the people with whom he conducts his business.

The field of dispatching is so diversified and extensive as to furnish subject material to permit a training course to go on and on indefinitely.

Dispatching's greatest requisite is good communications. In the early days of dispatching, telegraphy was the principal medium of communication. Two-way radio is a very valuable adjunct to dispatching, although its use is limited by the Federal Communications Commission to emergencies and to locations where other means of communication are not available. Present-day dispatching counts heavily on radio for efficient operation.

Duties of the organization

The principal duty of the organization is to coordinate the activities of the various departments, so that the gas will be delivered from points of receipt to its many customers, regardless of the amount, the time or the condition. To accomplish this, the dispatcher must take four definite steps. He must estimate the demand; order the required gas turned on at the source; issue orders to maintain pressures that will deliver this quantity of gas to the market, and check terminal pressures to ascertain with what degree of accuracy his objective is being carried out.

One of the unusual conditions under which a dispatcher operates is that he is obliged to direct the activities of personnel of other departments, in regard to the delivery of the gas, without going through the usual lines of authority.

Successful operation under these conditions can only be accomplished by developing complete understanding of one department's obligation to the other. It cannot be established by command, but must be acquired by cooperation and fair dealing in day-by-day performance of their duties.

The dispatcher may be of service to other departments in many ways. He may determine the most suitable operating pressures for compressors, balance load between stations to permit the most economical operation, maintain minimum pressures consistent with good service, reroute gas whenever possible to allow isolation of lines for repairs thus eliminating the hazards and makeshift repairs resulting from working under pressure, maintain pressures on field stations so that legible orifice meter records may be obtained, anticipate changes in demand or system changes in advance to permit orifice plate or meter changes, and forecast the demand sufficiently in advance, if possible, to permit the operation of wells without overtime.

Often incoming gases vary in heating value to such an extent that a major problem is presented to the dispatcher. Push button operation is fast coming into use in modern dispatching and presents a new technique in performance of his duties. Maintenance of records-of-operation is of great importance. They serve as a history of the company's operation, a guide for future dispatching and are frequently used by other departments.

There are some people who believe that dispatchers have a slack season during the summer. Actually, this is the season when the dispatchers are busy rerouting gas in preparation for line repairs, adjusting compressor loads to permit engine overhauling, planning and executing stress testing of pipelines, and where underground storage is involved, the particular problem of directing its flow to the storage areas.

Additional activities

Many companies have developed their dispatching organization to a point where it is also active in planning transmission facilities, estimating future requirements, making sendout reports, testifying before regulatory bodies and participating in numerous other activities. It serves as an information bureau supplying information both up and down the line of authority. There seems to be no formula by which we can establish the minimum or the maximum

(Continued on page 38)

FEDERAL POWER COMMISSION

Operating Revenues and Income in September

Operating revenues of natural gas companies reporting to the Commission totaled $156,075,179 in September of 1953, an increase of 18.2% over September 1952 receipts. For the 12 months ended September 30, revenues aggregated $2,249,079,388 or 21.4% higher than revenues received in the 12 months ended September 30, 1952.

Gas utility operating income for September 1953, amounted to $13,723,248, down 9.8% from September of last year. For the 12 months ended September 1953, gas utility operating income was $313,520,797, representing an increase of 14.8% over the comparable period ended in September 1952.

Net gas utility plant of the reporting companies aggregated $5,376,105,827 on September 30, 1953, up $539,641,933, or 11.2% over the figures reported a year ago.

Gas operating revenue deductions during September 1953, amounted to $142,534,922, in increase of 21.9%. Of this total, operating expenses accounted for $114,731,107; depreciation for $14,759,913, and taxes for $13,043,902.

Gas sales to ultimate consumers during the month were 197,117 MMcf, and increase of 9.7% over September 1952.

Sales to residential, commercial and industrial consumers increased 8.1%, 4.6%, and 9.8%, respectively, while revenues from the three classes of service increased 16.2%, 13.4% and 18.8%, respectively. Revenues from all sales to ultimate consumers increased 17.7%, and amounted to $61,302,956.

Net income of the companies for September 1953, was $6,018,969, down 27.4% from September 1952. For the 12 months ended September 1953, net income of $225,223,670 represented an increase of 11.1% over the comparable 1952 period.

Suspend Proposed NYS Natural Rate Increase

The Commission has suspended a proposed $5,306,000 annual wholesale natural gas rate increase by New York State Natural Gas Corp.

The company had proposed to make the higher rates effective on November 21. The increase is suspended until April 21, through the five-month suspension period allowed by the Natural Gas Act. If the Commission has not reached a decision by that time, the new rates may, upon motion by the company, be placed into effect under bond and subject to refund.

The company had based its proposed increase partly upon a claimed increase in the cost of gas purchased from Tennessee Gas Transmission Co. and Hope Natural Gas Co. However, the FPC said, Tennessee's and Hope's proposed increases have been suspended. New York State Natural also proposed other major tariff changes involving abandonment of its rate zones and changing from straight line and block commodity rates to a system-wide demand and commodity rate.

The Commission said that the proposed increased rates and other tariff changes "have not been shown to be justified and may be unjust, unreasonable, and otherwise unlawful."

The proposed increase would affect more than 20 utility customer companies in New York, Pennsylvania and Ohio.

United Fuel Rates Okayed—Revenue Increase to be About $1,340,000

The Commission has issued a supplemental opinion and order prescribing natural gas rates for United Fuel Gas Co. which will increase the company's revenues by about $1,340,000 annually, based on the test year ended June 30, 1952, over those allowed by the FPC in a decision issued last August 7.

The supplemental opinion was issued by the Commission following a rehearing on certain parts of the August 7 opinion and order, which involved two proposed rate increases by United Fuel—one totaling about $7,000,000 per year which was allowed, and the second for approximately $6,900,000, which the Commission reduced by almost $3,000,000. The rehearing involved only the second increase, which has been in effect under bond since last February 15.

The Commission found that the level of United Fuel's local production during 1953 was expected to be somewhat lower than the figure on which the August 7 decision was based and said the new estimate for local production would result in a cost of service related to interstate wholesale sales of $57,850,202.

The Commission, however, rejected United Fuel's contention that the rates allowed would earn only a 3.69% rate of return instead of the 6¼% which FPC found to be reasonable.

In connection with the alleged impact of the Commission's decision on the entire Columbia Gas System, the FPC pointed out that "in view of the fact that we regulate only about one-third of Columbia's ultimate sales revenues we can not insure the overall earnings of the system." The FPC added that it could not guarantee "for any relatively short period of time, as contrasted with normal operations for which rates are fixed, that weather or other conditions will be such that United Fuel or Columbia will earn the 6¼ percent return we heretofore found reasonable."

Ruling on another issue raised by United at the rehearing, the FPC reaffirmed its earlier conclusion that consumers should be charged only the company's actual liability for Federal income taxes, and that any reduction of this cost effected by the filing of a consolidated tax return by the Columbia System should be reflected in the costs charged to consumers.

The Commission's new order directs United to refund to its customers the difference in the rates which it has been collecting under bond since last February 15 and those which have now been prescribed.

American Gas Fundamentals OUTLINE

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- *Geology
- *Drilling and completion
- *Methods of estimating reserves
- *Chemicals from gas
- *Natural gas conservation
- *Underground storage of natural gas

MANUFACTURED GASES
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- Interchangeability

LIQUEFIED PETROLEUM GASES
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- Personnel Management

GLOSSARY
- *Ab-to-Met

***Indicates chapters published since January 1, 1951; available without charge to new subscribers to American Gas Journal.**

How to Use the Material

American Gas Fundamentals *is a comprehensive compilation of basic gas facts to guide any gas utility employee toward a broader understanding of the industry as a whole.*

The series is designed to be removed from each current issue of AMERICAN GAS JOURNAL *and filed in a ring binder where it may be accumulated into a text book of permanent usefulness. Material should be filed under the major subject head appearing in the upper right hand box at the head of each chapter.*

Communications in the Gas Industry

COMMUNICATIONS, as the term applies to the gas industry, includes all methods of electronic transmission of messages, reading of remotely-located instruments and controlling the operation of remotely-located equipment.

Two broad categories embrace all communications services utilized by the industry: telephone and radio. More specifically, the gas industry—from the producing area to the consumer's door—utilizes telephone; teletypewriter; and portable, mobile and fixed radio facilities to insure fast, efficient, economic and safe operations.

Individual gas company expenditures for communications range from monthly bills for normal business telephone service to multi-million-dollar investments for radio equipment, combined with the continuing costs of operation and maintenance. However, the costs, whether modest or great, were subject to accounting analysis that would enable well-managed companies to relate, beforehand, the anticipated costs of communications to the resultant economic and operating benefits. And, it must be assumed that substantial advantages were expected from the selected facilities.

Maintenance of a favorable competitive position in any modern industry depends heavily upon its operational adoptions of advantageous technological advancements. The gas industry, as a whole, has shown its readiness to use such advancements and its phenomenal growth can be attributed, generally, to them.

The technological scope, precision and dependability of communications services and equipment give the gas industry new operating tools that are in characteristic harmony with high pressures, large gas volumes, long distances, and an improved safety record.

Taking first things first, the geologists who explore for undiscovered gas and oil use communications equipment as the very heart of their technologies.

The reflecting seismograph, described in the chapter, "Geology and the Gas Industry," is a means of communicating to a moving strip-chart the indications of subsurface formations, for interpretation with respect to possible gas and oil deposits.

Individual field crews, working at distances from their base, coordinate operations through portable radio stations, commonly called walkie-talkies. Their mobile equipment, jeeps, swamp-buggies, boats, airplanes and helicopters also are equipped with two-way radio equipment.

When drilling operations are started in the natural gas production areas, the contractors place a high operating value on their communications facilities because of the conservation of time, an important drilling consideration, made possible by high-speed communication. Low-powered radio transmitters on the drilling rigs are used for requests to the contractors' bases of operations and often, when needs are anticipated by only a short time, the required material or equipment is delivered without incurring any down-time on the rig. The contractors' trucks are equipped with two-way radio, thereby completing the network of rig-base-trucks.

The operations in a coordinated producing area depend upon communications facilities for efficiency and economy. Modern production methods in gas and oil fields give serious attention to conservation; avoiding waste of either liquid or gas after they have been brought to the surface. If the gas gathering system connected with a producing area cannot take, or does not have the demand for all gas being produced at any given time, this information flows back rapidly from the processing plant where the liquid-content of the gas is removed and the gas is prepared for pipeline transmission to consuming areas. In this case, the means of communication may be telephone, teletypewriter or radio.

The operators at the producing area are able to act immediately on the information to recycle some or all the gas; return it to the underground producing zones for maintenance of pressure on the crude petroleum and for subsequent reproduction to the surface. Wasteful flaring of gas, no matter how small the volume, is avoided. Later, when there is a demand for more gas, by the processing plant and the gathering system, that information is communicated rapidly to the field operators and they change the gas flow accordingly.

Pipeline construction contractors coordinate their work, as they extend the constantly-growing gas network to all sections of the Nation, by using radio facilities. In general, they use the same type of radio equipment as the drilling contractors, but the importance of ready-communications is even greater to the pipeliner due to the extremes in terrain and the distances with which he usually contends. The work of a pipeline spread, or construction crew, is characteristically organized so that ditching, pipe delivery, welding, coating, pipe laying and backfilling move along the route with production line speed and efficiency. Therefore, the emergency that cannot be anticipated requires speed to avoid or minimize delays in the progress of construction. Two-way radio goes into action at such times.

Gas transmission pipelines

The most dramatic utilization of communications services and equipment, from the viewpoint of distance and type of application, is made by the transmission pipelines that connect the natural gas producing areas with the distant heavily-populated and -industrialized consuming areas.

The transportation segment of the gas industry makes the most extensive use of communications: radio, telephone and teletypewriter. However, the applications of these services and equipment are much more complex than in other segments of the industry due to the more complete utilization of the capabilities of the media.

Telephone service is usually maintained from one end of

a transmission line to the other, with intermediate points of contact at compressor stations and offices along the line. This facility may be made up of one or more channels, depending upon the need, and becomes a private telephone system using the familiar dial telephone instruments.

The operation and maintenance of the facility may be cared for by the long-distance telephone companies, as a leased service. The equipment employed by the telephone companies in the operation of a leased service may include pole-strung wires, buried cable, microwave radio or some combination of them. However, regardless of how the voice is carried, from one point to a selected second point, the effect is the same as establishing a local dial telephone connection even though 1,000 miles or more may separate the points.

Where the need for telephone communication over a transmission pipeline system reaches extensive proportions, it may be found on analysis that it is more efficient and more economic to build, operate and maintain a privately-owned microwave radio system. Here again, there is most apt to be some use of wires to make the desired contacts along the route of the pipeline, but the individuals who use the facility do not distinguish it from the conventional dial telephone.

Telephonic communication, either by wire or radio, in natural gas pipeline systems is used for administrative purposes but it has a vital place in the big job of dispatching gas to the distributing gas utilities that are the pipelines' customers. Instructions to increase the rate of delivery to one customer, decrease the rate to another and inject or withdraw gas from an underground storage area can be determined in a chief dispatcher's office, transmitted by telephone to the three distant stations concerned, and the changes effected—all in a matter of minutes, with constant coordination of operations at the headquarters office. Immediate communications among the stations is essential; possible delays in establishing contact through public long-distance telephone facilities could not be tolerated—only the leased or owned facilities will serve adequately in dispatching the large volumes of gas that are involved in pipeline operations.

Teletypewriter facilities are utilized by the large gas transmission companies, as an adjunct to their telephone facilities. This equipment, too, may be installed, operated and maintained as a leased service of the long-distance telephone companies. Messages typed by pipeline employees can be directed to one or simultaneously to more than one station or office on the system, by appropriate dialling of the assigned teletypewriter numbers. As in the case of telephone service, the actual transmission through telephone company facilities may be by wire, microwave radio or a combination of both.

A gas transmission company that has its own microwave system would, ordinarily, have its own teletypewriter equipment and coordinate its operation with the radio system.

Obviously, teletypewriter communication has the advantages of written records for sender and recipient. It is used for administrative and operational messages which should be delivered earlier than if they were sent by mail, or which are so detailed that they cannot be readily and reliably sent by telephone. Some companies use their teletypewriter facilities for gas dispatching messages.

Distinctly separate from microwave facilities, which actually beam radio waves from one point to another, most pipeline companies have other radio facilities that are used to communicate with employees who are assigned to cars, trucks and airplanes. In general, the fixed radio stations in this system are located together with the microwave stations. In fact, the stations used to communicate with employees in automotive equipment can be operated by remote control, interconnected with the microwave system.

With practically all cars, trucks and planes radio-equipped, every key employee of a pipeline company is only a "voice length" away from any compressor station or office along the entire system. That closeness of employee-contact, over the length of a pipeline, cannot be evaluated in dollars. The high value is evident in the time that can be saved in directing the field force to meet specific and immediate requirements, routine or emergency; in the transportation mileage that is saved; in the overall increase in employee-efficiency; in the operating efficiency of the pipeline itself and the vast contribution to operating safety.

Of course, messages originate in the automotive equipment, as well as at the offices and pipeline stations. From that viewpoint, other incalculable advantages are obtained in cases of emergency through the direct observations of trained personnel. As the need arises, the personnel in automotive equipment can communicate from unit-to-unit—again, without regard for the miles that separate them.

Reading of remotely-located instruments was referred to in the first paragraph of this chapter. That gas industry operation is known as telemetering and it is an electronic development now in widening-application by the gas transmission companies.

Telemetering, in a simplified definition, is the medium for reproducing at some central location the measurements of operating conditions that exist at remote, unattended, points.

A pipeline operator can dial, selectively, a distant unattended station and, as a response, thereafter read on conventional instrument dials in front of him, such conditions as pressures, flow rates and temperatures at the distant station. This has the effect of going directly to the station and taking the same readings from similar instrument dials. In rapid succession, he can dial all the stations with which he is concerned and record their conditions—without leaving his desk.

The electronic impulses that are involved in telemetering operations may be sent over either a telephone system, by microwave radio or a combination of both. And, as a note of interest, with no mutual interference, they can be sent over wires that are carrying, simultaneously, telephone conversations.

Remote control of operating equipment is usually coupled with telemetering operations in a gas transmission system. In fact, remote control is just another application of the same principles that are employed in telemetering.

If the operator wants to change a condition at a remote station, such as rate of gas flow to a distribution utility, after he has taken a telemeter reading, he dials a code number for a specific valve and then presses a button for a predetermined number of seconds, during which the valve is opened or closed to the point required for the desired change. Then, by either subsequent or coincidental telemetering, he can verify the accuracy of his change on the dials in front of him.

How does he know that he is communicating with the correct distant station, rather than one that is miles away

and related to a different gas distribution utility? In addition to the instruments before him, he has a large diagram of the part of the system he controls, with a light for each station and every remotely-controllable valve in each station. As he dials, the selective code numbers for stations and valves, the impulses go to the distant points and, at the same time, to the corresponding lights on his visible diagram, thereby confirming the accuracy of his dialling.

Gas distribution utilities

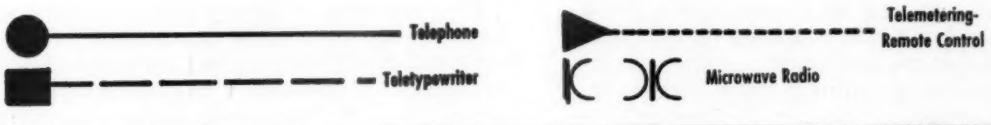
When a gas distribution utility receives natural gas from a transmission pipeline, communications between the two companies are an immediate and important operating factor. Simply stated, the respective dispatchers must know the volume, pressure and time interval of the utility's requirement for pipeline gas. These are vital considerations to the utility; but the pipeline must have the information to meet the requirement. Usually, the information is given by telephone or teletypewriter, but some large utilities, with extensive need for communications with the supplier-pipelines, have full-time leased or private telephone connections, or they may be on a leg from the pipeline's microwave radio system.

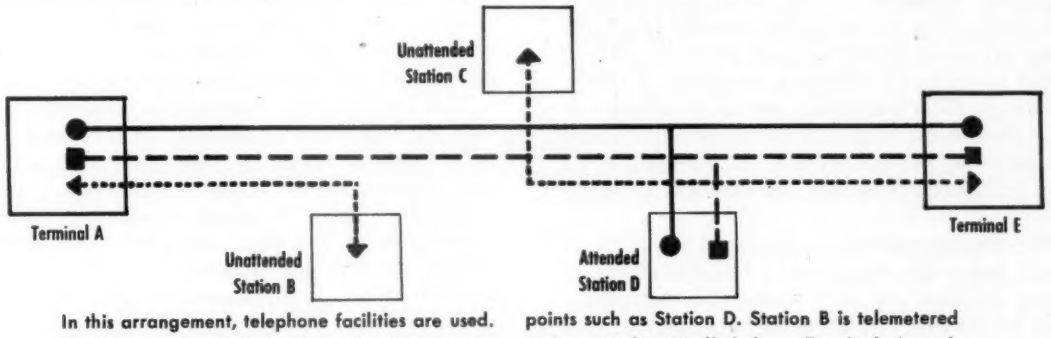
Gas distribution utilities have applied, with high operating advantages, all the methods of communications utilized by the long-distance transmission pipelines. The utilities, due to their generally more-concentrated service areas, have less complicated systems than the pipelines and some of the purposes are different. However, the final results of adequate communication are the same: speed, efficiency, economy and safety.

The telephone is the principal means of contact with a gas utility's customers. Some companies have heightened their customer-relations by adopting a special telephone

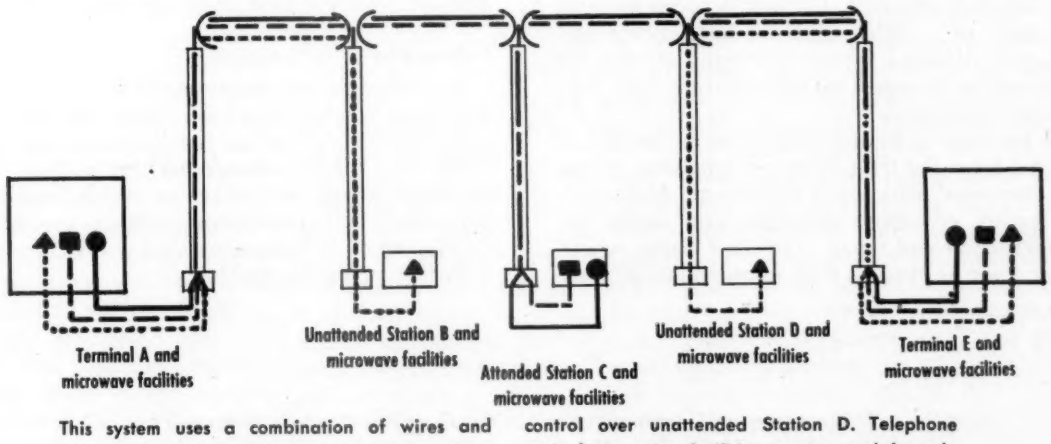
REPRESENTATIVE DIAGRAMS OF GAS INDUSTRY COMMUNICATIONS SYSTEMS

SYMBOLS





In this arrangement, telephone facilities are used. Terminal A has telephone and teletypewriter communications facilities through the entire system to Terminal E, with intermediate contacts at points such as Station D. Station B is telemetered and remotely-controlled from Terminal A and, similarly, Station C is telemetered and remotely-controlled from Terminal E.



This system uses a combination of wires and microwave radio. Terminal A, through its microwave facilities, controls the operation of Station B, which is unattended. Terminal E has the same control over unattended Station D. Telephone and teletypewriter facilities are operated throughout the system, from A to E, with contact at all attended stations such as C.

plan that assigns a well-publicized public telephone number to the customer-service department. Calls to that number go directly to members of the service department who are trained to care for most details that might arise in customer-conversations.

Under that plan, the first gas company employee to talk with a customer is the one the customer really called; there is no need to talk with a switchboard operator. In those instances when information must be obtained from some other department, such as accounting, a hold-button makes it possible to get the information on the same telephone and then return to the conversation with the customer.

The telephone has many other uses in the communications requirements of a gas utility. In addition to the usual administrative applications, the principal use is in the operating department. Coordination is essential, especially in the operations of a company that receives natural gas from a pipeline, and has a peak shaving plant, a liquefied petroleum gas storage plant or both. The sendout of the type and volume of gas in accordance with the demand is coordinated by instructions issued at a central office over the telephone.

The larger gas utilities can reach all their plants and offices through one switchboard; the smaller utilities find it more economical to have individual numbers for each unit.

Selling gas service and gas appliances, a matter of currently-grave concern to the gas utility industry, is being approached by some companies with carefully-devised telephone campaigns. Members of the sales departments, working from lists of known-prospects, use the telephone for their initial contacts, following with personal calls in the cases where a degree of interest is indicated. Usually, these campaigns consider only one appliance category at a time. Results from these telephone campaigns have been so successful for some companies that the campaigns are established as permanent features for business development.

Telemetering-remote control, as described for pipeline operations, also has a definite place in the operations of gas distribution utilities. As they apply the techniques, they are able to maintain centralized surveillance over such equipment as regulator stations, propane storage plants and the city gate stations where gas is delivered from the supplying natural gas pipelines. The operational advantages over sending a man or crew to make necessary changes are quite apparent. The link between the central control point of a utility and the instruments and equipment is most often a telephone company service; the metering and control impulses do not interfere with conversations on the same lines.

The use of two-way radio communication by utilities is widely apparent from the tell-tale hatpin antennae on the tops of the companies' automotive equipment. All the advantages of speed, economy, efficiency and safety are realized. Construction and repair crews, no matter where they are located, are as close as their microphones to their shops and warehouses. Supervisors are in touch with all their crews and can coordinate their work without amassing travel mileage.

While all well-managed and efficiently-operated companies use every precaution to avoid emergencies—there still are emergencies. Those are the times—maybe minutes or hours in duration—when the values of immediate, direct and concise communications have the highest value to utilities that are adequately equipped.

The customers of a gas company get a direct impression and value from two-way radio, when they make service requests. Routine requests probably are always handled in the order of receipt, with respect to the service districts of a company. But, the service car that is close to a location from which there is a complaint of leaking gas can be at the location in minutes after the call has been received at the central office. The radio dispatcher knows where each car or truck is operating and he knows which of them is attended, at any time. The drivers report when they leave and return to their vehicles. In cases of serious leakage-indications, vehicles that are farther away than a nearby but presently-unattended vehicle can be dispatched to the location.

The most modern radio equipment installed in gas industry vehicles includes devices that selectively signal the individual drivers only as they are called. Also, instead of listening to loudspeakers, they pick up what appears to be conventional telephone instruments to answer and talk with either the headquarters station or other vehicles. Anyone who has ridden in a radio-taxicab with the earlier, non-selective type of equipment knows the irritation that can come from a chattering loudspeaker.

The headquarters transmitting equipment used by gas utilities is located to obtain full coverage of the companies' service areas. In many cases, due to limited range, this requires more than one transmitter; the additional transmitters may be either attended or unattended, depending upon individual company considerations. Unattended stations are remotely-controlled from the headquarters station in a manner that gives all transmitters the effect of being a single unit. However, they are operated independently as required to contact vehicles that are within their separate ranges of transmission. The remote transmitting units are connected with the headquarters station by telephone wires and the versatile dial permits selection of the station to be operated.

Future use of techniques

Communications equipment and services are now essential to gas industry operations. Full utilization of the presently-available potentials has not been reached and may not be reached for a five-to-ten year period. The years immediately ahead will reveal an ever-widening utilization, particularly by distribution utilities, together with new developments in techniques that will be applicable to the industry's operating problems.

This chapter on Communications in the Gas Industry was prepared by
Hilding H. Carlson, Managing Editor, American Gas Journal

Decisions on Rate-Making Reviewed

by Leo T. Parker
Attorney at Law
Cincinnati, Ohio

A REVIEW of late court decisions reveals that a just and reasonable rate can never exceed—and perhaps rarely equal—the value of the service to the consumer, and it can never be made, by any law, so low as to amount to confiscation. A just and reasonable rate must therefore fall between these two extremes, so as to allow both sides to profit by the conduct of the business, by the improvement of methods, and by the increase of efficiency.

Another important rule established by leading higher court decisions is this: Fair and reasonable gas rates, and justice to the consumer, ordinarily, would require a rate somewhat less than the full value of the service to him, and justice to the company would ordinarily require a rate above the point at which it would become confiscatory. A just and reasonable gas rate, therefore, is necessarily a question of sound business judgment rather than one of legal formula, and must often be tentative since exact results cannot be foretold. Like other questions in law that involve reasonableness of conduct, it is a question of fact to be settled by the good sense of the court. That it is not a question of legal formula is shown by a decision of the United States Supreme Court in San Diego Land & Town Company v. Jasper, 189 U. S. 439.

This court held that a gas rate may be reasonable although it fails to produce an adequate return to the gas company, owing to the fact that the business has not developed sufficiently to be remunerative, or that the plant is on a larger scale than is justified by the demand. Under this unusual rule of law the gas company must have almost certain prospects of increasing its income in the near future by gaining many new customers at relatively small expense. Otherwise, this rule is not at all applicable.

Interruptible and off-peak rates

Considerable discussion has arisen from time to time over the question: "Can a public service commission ever increase gas rates without determining the present earnings and future prospective earnings of the gas company?"

A higher court recently answered this question in the affirmative. In reviewing this case in detail some unusually valuable legal information, on the validity of gas rates, will be found.

In Illinois Commerce Commission v. Peoples Gas Light & Coke Company, 112 N. E. (2d) 141, testimony showed these facts: The State public service commission approved the tariff amendments and increased rates proposed by The Peoples Company, with respect to gas sold in large volume to industries in a city on an interruptible or off-peak basis. The interruptible customers are subject to curtailment of service if serving them would increase the demand beyond the existing capacity of the company at any given time, with processing customers receiving a two-hour notice and boiler fuel customers receiving a 30-minute notice. These tariff amendments provided for an increase of about 30% in interruptible and off-peak gas rates, and for the curtailment of interruptible boiler fuel service before curtailment of interruptible processing service. Certain interruptible and off-peak gas customers, adversely affected by such tariff increases, filed suit and asked the higher court to disallow the rate increases. These various consumers, who filed the suit, purchased interruptible natural gas for boiler fuel purposes. It was their main contention that an increase in their rates was not justifiable because the public service commission had not in any way attempted to determine the gas company's present earnings before increasing the rates for interruptible and off-peak gas consumers. Further testimony showed that the gas company furnished gas to approximately 1,000,000 customers in the city and the new increased rates applied to 8 large interruptible customers and 504 off-peak customers. It was contended by these consumers that the increased rates payable by them were unjust, unreasonable, and discriminatory with respect to the firm customers of the company, and that any gas available for sale to interruptible and off-peak users, after the firm customers had been supplied, should be regarded as a surplus commodity and its price fixed on a competitive basis with other fuels, and the increased revenue applied to a reduction in rates and charges for gas sold to firm customers.

Further testimony disclosed these facts: In the late 1920's all of the gas which the company sold was either purchased by-product gas or gas manufactured by the company's own production facilities. It hit upon the plan of selling excess gas at "off-peak" rates for customers who would be willing to use gas as an alternate to their regular fuel during periods when the firm demands were low. The off-peak rates were, as is usual, lower than the rate to firm customers.

In 1931 natural gas became available and was mixed with manufactured gas for distribution. Notwithstanding that, the public service commission did not investigate the earnings or present value of the gas company's property, the court said;

"In reviewing an order of the commission, the courts are limited to a consideration of the questions of whether the commission acted within the scope of its authority, whether it made findings in support of its decision, whether the findings and decision have a substantial foundation in the evidence, and whether constitutional rights have been infringed by the decision. The statute does not authorize a court to put itself in the place of the commission and to determine independently the issues presented, or to substitute its judgment for that of the commission. The findings of the commission that the revised rates and charges filed by the company and approved, are just, is supported by the evidence and is within the authority of the commission. It cannot, therefore, be disturbed by this court. The revised rates for the interruptible and off-peak service are just and reasonable. The order of the commission cannot therefore, be set aside by the court."

Cost not important

Another contention was made that the increased rates for gas, in the above case, were void, the contention being that the only basis for determining whether gas rates are just and reasonable is the incremental cost of furnishing the service. The higher court refused to agree with this, and said:

"We have determined that the various services of the gas company cannot logically be segregated for the purposes of rate-making. The evidence also discloses that the very purpose in disposing of the excess gas to these interruptible and off-peak users was for the purpose of obtaining the gas at a cheaper rate and to sell the excess at such a profit as would cut the cost of gas and improve the service to firm customers."

For comparison see Illinois Central Company v. Illinois Commerce Commission, 387 Ill. 256. This court held that the costs for a particular service must include not only the specific expenditures, but also a just portion of the expenses incurred for all services of

(Continued on page 37)

Where New Products Are Born

Interior view of a Rockwell plant physical laboratory

ALUMINUM METERS

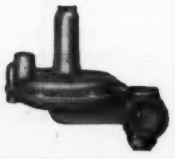
TIN METERS

CAST IRON METERS

PRESSED STEEL METERS

ORIFICE METERS

APPLIANCE REGULATORS



SERVICE REGULATORS

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Exterior view of a recently completed Rockwell research laboratory in East Chicago, Indiana

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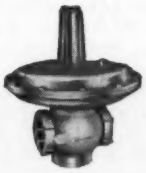
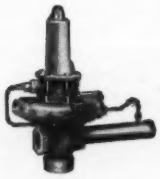


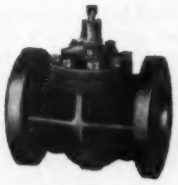
INDUSTRIAL REGULATORS



"1001" REGULATORS

BALANCED VALVE REGULATORS

NORDSTROM SERVICE COCK



NORDSTROM STANDARD VALVE

NORDSTROM HYPRESEAL VALVE

Bond Market Continuing Strong

But Economists Warn Against Overextension of Bond Financing

by John F. Falvey
Financial Editor

John F. Falvey

FINANCING by the public utility industry to date this year has gone counter to the general corporate trend in several important aspects. Whereas financing by all industry in the first nine months of 1953 declined to $6.4 billion, for a drop of 10% from the level of the corresponding 1952 period, flotations by the straight gas operating companies increased to $902 million for a gain of 5% and electric company financing, at nearly $2 billion, was up 43%.

What is even more important is the fact that both branches of the utility industry have followed a more conservative pattern than other segments of industry. And in this respect the gas companies have done well, 73% of their new issues comprising debt, compared with 86% a year ago. The ratio of debt to the total was up 68% for the electric companies this year, from 62% a year earlier. But for all industry the portion of funds raised through debt this year hit $5 billion, or 78% of the total.

The inclination to raise increasing proportions of new money through sale of debt securities has drawn recent warnings from two important meetings, the New York Society of Accountants and the Investment Bankers' Association. The warnings were two-pronged, one being directed against management that the debt situation could get serious if recession should come about and make difficult both the payment of interest and refunding of maturing debt on a favorable basis. The other was aimed at taxing authorities to give serious thought to eliminating the double tax on dividends and possibly reducing the holding period for capital gains on stocks to make common stock investment more attractive for the average investor.

It is well known in this corner that utility management is cognizant of the benefits of a conservative capital structure, from the standpoint both of the investment rating accorded their bonds and of the interest cost basis on which soundly situated bonds can be sold.

The equity behind the proposed new debt issues is scrutinized by members of every investment banking syndicate which is considering bidding for the issues; and while no hard and fast norm prevails for prescribing investment ratings, the coveted AA or A1 ratings are out of the question if debt is much over 50% of total capitalization and surplus, unless earnings coverage for fixed charges exceeds five times before income taxes. As a rule, it might be added, capitalization and earnings run on the nearest thing to parallel paths, especially now that an increasing number of rate increases given utilities by regulatory commissions during the recent past have been based chiefly, if not entirely, on an investment base.

While the bond market lately has been showing improvement, indigestion has developed as underwriters "reached" for one or two of the new issues. This caused some hesitation on the part of bidders for succeeding new issues. But the interest cost to issuers of new "A" or soundly rated bonds at this writing is in the neighborhood of 3.53%. The temporary unsettlement might prove to be a warning light to both bidders and issuers however, that the market, while improved, easily could become subject to further indigestion in the event either party to the sale of the new issues overrates the appetite of the bond market from the standpoint either of volume or of too high offering prices.

At present interest cost levels the new offerings have received favorable reception in the market. Despite the fact that no less than $90 million of utility debt securities were offered publicly in the past fortnight, the backlog of previously offered issues still on shelves of the underwriters was reduced in the past week by $15 million to about $50 million. This represents just about a good working inventory unless a heavy volume of new offerings hits the market and causes a glut.

A good part of the recent improvement in placement of new issues is traceable to renewed buying by some of the large life insurance companies, one of which took 20% of one fairly large offering.

Savings banks have continued to stress bonds as their medium of corporate investment and have given but little heed to common stock, as mentioned in this column on several occasions in the past couple of years. Now the matter has

(Continued on page 39)

INDEX OF YIELDS : SELECTED UTILITIES STOCKS

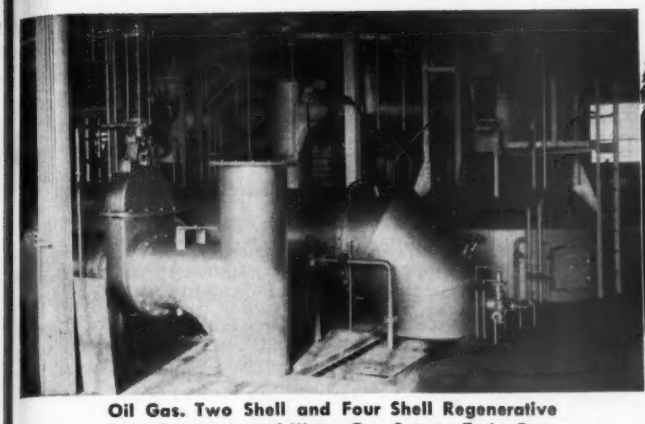
	Nov. 1953	Oct. 1953	Sept. 1953	Aug. 1953	July 1953	June 1953	May 1953	Apr. 1953	Mar. 1953	Feb. 1953	Jan. 1953	Dec. 1952
Natural Gas Transmission Companies	4.44%	4.44%	4.90%	4.46%	4.76%	4.72%	4.34%	4.18%	4.04%	3.95%	4.04%	4.04%
Natural Gas Transmission & Distribution Companies	5.49	5.58	5.74	5.13	5.41	5.55	5.28	5.06	4.91	4.91	5.02	4.99
Manufactured & Mixed Gas Companies	4.75	4.94	5.14	4.99	5.06	5.08	4.80	4.73	4.63	4.65	4.87	4.83
Class "A" Electric Companies	5.15	5.14	5.41	5.27	5.41	5.53	5.18	5.14	4.97	5.05	5.08	5.10
Class "B" Electric Companies	5.14	5.37	5.61	5.50	5.41	5.68	5.35	5.06	4.93	5.08	5.19	5.08

This is a straight arithmetical index of comparative yields obtainable on a selected group of gas and electric utility industry common stocks.

The companies comprising this index have been selected by the AMERICAN GAS JOURNAL as providing a representative cross-section of each industry, from the standpoint of geographical diversification and of the relative importance of the individual companies in their areas.

No effort has been made to weight the average to give effect to changes in capitalization or in dividend rates because the yields afforded on the issues reflect such changes. The index is designed to show the rate of return and not necessarily market movements on the stocks comprising it.

This index is compiled from: natural gas transmission companies, 5; natural gas transmission and distribution companies, 5; manufactured and mixed gas companies, 4; class "A" electric companies, 4; class "B" electric companies, 5.



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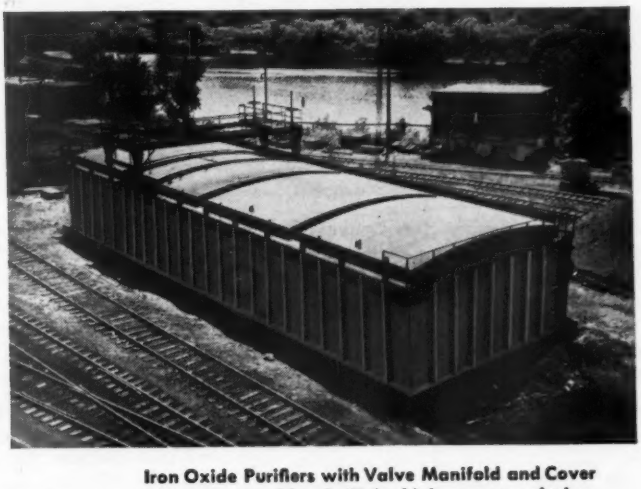
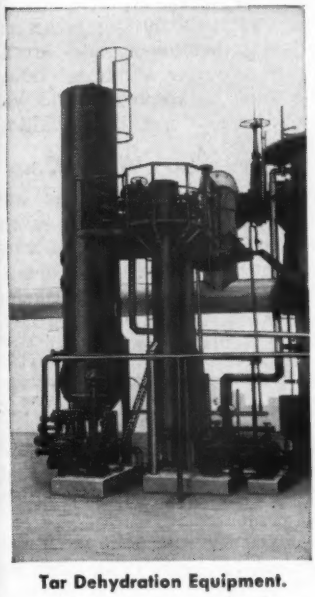
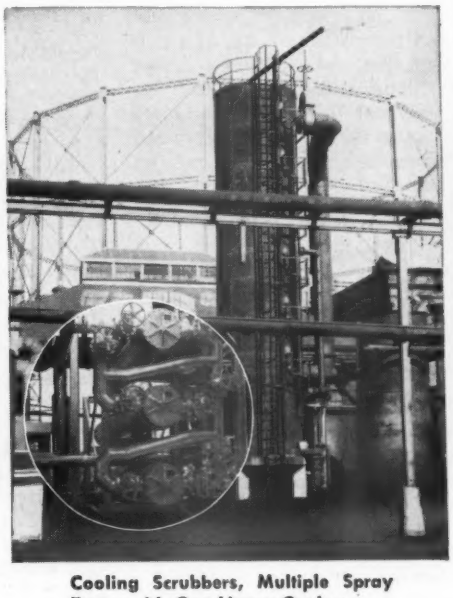


Iron Oxide Purifiers with Valve Manifold and Cover Lifting Crane. Also built in high pressure design.



Tar Dehydration Equipment.



Cooling Scrubbers, Multiple Spray Type, with Gas Liquor Coolers.

Automatic Controls, Gauge Boards, and accessories.

GASMACO has these and many other items for the gas plant, such as equipment and processes for thermal or catalytic cracking of hydrocarbon feeds and for liquefaction, storage and regasification of natural gas.

Call or write for a list of GASMACO's complete line of equipment and services. Our engineers will be pleased to review your requirements and to prepare special designs if needed.

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Gas Plant Equipment and Industrial Furnaces
THE GAS MACHINERY CO. (Canada), Ltd.
HAMILTON, ONTARIO

News of the Gas Industry

This Brooklyn Borough Gas Company service truck participated in the recent annual New York safety parade sponsored by the National Safety Council and the Greater New York Safety Council. Upon the truck were mounted two safety posters; one asking for the practicing of safety every day, and the second an American Gas Association accident prevention award which had been presented to Brooklyn Borough Gas. The AGA award was presented in recognition of the company's achieving more than a 25% reduction in the frequency rate of accidents during 1952, as compared with the previous year.

Name Chairmen of 4 AGA Committees

The appointments of chairmen to the rate, corporate secretaries, personnel and home service committees of American Gas Association, for 1954, have been announced.

George A. Morgan, superintendent, market research department, The Peoples Gas Light and Coke Co., Chicago, is chairman of the rate committee.

B. H. Harper, secretary, Northern Natural Gas Co., Omaha, is chairman of the corporate secretaries committee.

Elmer L. Ramsey, assistant vice president of employee relations and director of industrial relations, Laclede Gas Co., St. Louis, is chairman of the personnel committee.

Mary E. Huck, general home service director, The Ohio Fuel Gas Co., is chairman of the home service committee.

Group Buys Pittsfield Coal Gas Co

Controlling interest in the Pittsfield, Mass., Coal Gas Co. has been sold to a group of New York, Boston and midwest investment interests for a consideration reported to be $630,000, according to Kenneth D. Knoblock, the new president succeeding Robert W. McCracken. Mr. Knoblock is also president of Wisconsin Southern Gas Co. and a former president of New Jersey Natural Gas Co.

Elected to the new board of directors was Leonard Milano, gas consultant of Commonwealth Services Inc.

Active operating management will continue in the hands of Joseph P. Kelly, vice president and general manager.

New Gas Production in East Utah

Three States Natural Gas Co. has reported a flow of 140-150 MMcf of natural gas daily from its Helen Walton A-3 wildcat well in the Clear Creek field, in eastern Utah. Extending a mile to the south of the Clear Creek field, which previously showed reserves in excess of a trillion cubic feet, the new well adds about 1,500 acres of land to the proved reserves.

The A-3 well and the Paul Walton 1-x well, three miles to the northwest, produced from the Ferron formation at a depth of about 3,700 feet.

AGA Pattern for Profit Wins Award

Pattern for Profit, the dealer sales program sponsored by American Gas Association, has been awarded a 1953 best-of-industry award of merit in a national competition sponsored by Direct Mail Advertising Association, Inc.

Furnace Shipments Up in 10 Months

Shipments of gas-operated central heating equipment during the first 10 months of the year exceeded those during the comparable period of 1952 in two out of three categories, according to Gas Appliance Manufacturers Association.

Gas-fired furnace shipments totaled 438,100 units during the period, a 17.4% gain over last year. This was despite a 2.5% drop during October to 57,600 units.

Edward R. Martin, GAMA's director of marketing and statistics, reported that gas-fired boiler shipments during October amounted to 10,400 units to increase the total for the first 10 months to 63,500, a 10.4% gain over 1952's 10-month total.

Meanwhile, shipments of gas conversion burners fell below last year for the first time in 7 months, falling off to 188,900 units during the first 10 months, 5.6% below 1952. October shipments amounted to 26,200, 15.2% under the units shipped during the same month of last year.

Industry Fire-Safety Record Is Good

The gas industry again has established an outstanding safety record with regard to fires and fire losses, according to the latest report of National Fire Protection Association. Leading safety record in the category of fuels used to heat, light and serve the home, was the classification "gas and gas appliances" which stands 18 on a list of 24 causes of fires published by the Association for the year 1952.

Last year 8,300 fires causing a total loss of $9,050,000, out of a total of 703,000 fires with total losses amounting to $793,500,000, were attributed to gas and gas appliances.

By breaking down the category "Defective or overheated heating and cooking equipment," which included 80,000 fires from known and unknown causes related to heating and cooking equipment, the Association found, within that group, only 4,800 fires which were attributed to defective or overheated gas cooking and heating equipment, with a total cost of these fires amounting to $4,360,000.

Natural Gas Equipment Co Expands

Natural Gas Equipment, Inc., pioneer manufacturers and distributors of gas burning and regulating equipment, has just purchased and moved into new and larger quarters in Pasadena, Cal.

The new property consists of a modern warehouse and air-conditioned office building of approximately 15,000 sq. ft. According to J. V. Thomas, president of Natural Gas Equipment, a total investment of about $450,000.00 is represented in land, building, equipment and inventory. The move will give additional office space for the firm's 55 employees and will increase warehouse and operating facilities.

National Radiator Buys Viking Corp

The National Radiator Co. has announced its purchase of the principal assets of Viking Air Conditioning Corp. of Cleveland, O., and that the former Viking operations in Cleveland will be continued under the name of Viking Air Conditioning Div. of The National Radiator Co.

D. P. Hartson

D. P. Hartson, former vice president and general manager of Equitable Gas Co. and Pittsburgh & West Virginia Gas Co., died November 8, at the age of 64.

Mr. Hartson was an engineer with United Gas Improvement Co. until 1920, when he joined Equitable Gas Co. as a division superintendent. He subsequently served with the company as a gas distribution engineer, gas engineer, superintendent of production and transportation for Pennsylvania, manager of system development, operating manager, and vice president and general manager, the position to which he was appointed in January, 1942.

Mr. Hartson had served Equitable as a consulting engineer since his retirement in February, 1952. During his employ with the company he gained recognition as an authority and a pioneer on the process of underground gas storage.

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diaphragm!

Vulcan Diaphragms are the most trouble-free diaphragms available. They are made and checked to work accurately for years and years without a bit of attention. They contain no oil, and never need oiling. They operate efficiently in wet or bone-dry gas! Diaphragm seams are vulcanized, not stitched. They are tied to the rings with wire for positive safeguard against leaks.

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Vulcan RUBBER PRODUCTS, INC.

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PROOF

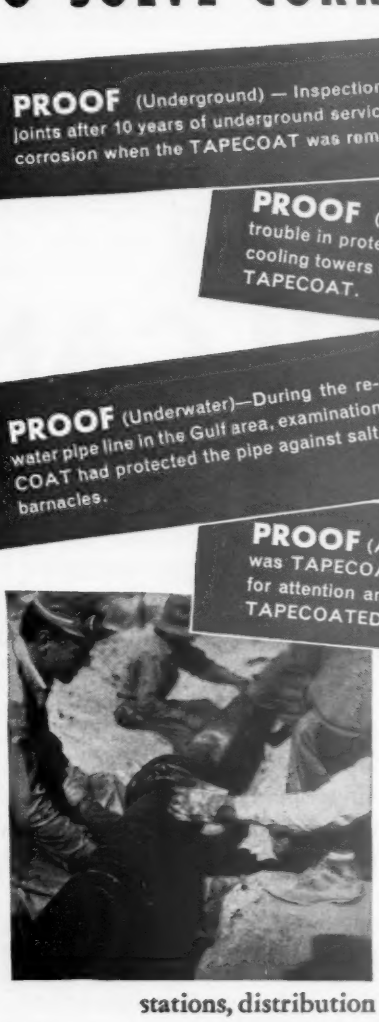
HERE'S HOW TAPECOAT® HAS STOOD THE TEST OF TIME TO SOLVE CORROSION PROBLEMS

PROOF (Underground) — Inspection of TAPECOATED joints after 10 years of underground service showed no sign of corrosion when the TAPECOAT was removed.

PROOF (Alternate wetting and drying) — Expense and trouble in protecting lines subject to wet and dry conditions at cooling towers have been eliminated since 1944 by coating with TAPECOAT.

PROOF (Underwater)—During the re-laying of an underwater pipe line in the Gulf area, examination showed that TAPECOAT had protected the pipe against salt water corrosion and barnacles.

PROOF (Above ground)—A gas line at a bridge crossing was TAPECOAT-protected in 1944. There has been no need for attention and *no interruption of service* since the pipe was TAPECOATED.



Actual experiences like these show what TAPECOAT coal tar protection can do for you.

Use TAPECOAT to combat corrosion above or below ground on gathering lines, transmission lines, meter stations, compressor stations, distribution lines, pipe joints, bolt-type couplings, fittings, large bends, large diameter pipe, insulated lines, tanks, and other surfaces subject to corrosion.

Write for descriptive brochure and prices

The TAPECOAT Company

Originators of Coal Tar Tape Protection

1529 Lyons Street, Evanston, Illinois

W. T. Jebb Is GM of Hartford Gas Co

W. T. Jebb has been appointed vice president and general manager of The Hartford Gas Co., effective January 4, 1954, succeeding Paul R. Buchanan, who is retiring after more than 38 years with the company.

W. T. Jebb

Mr. Jebb will come to the Hartford company from The Connecticut Light and Power Co., where he has been western division manager since 1939. He joined Connecticut Light and Power as gas engineer in charge of gas operations in 1929.

Mr. Jebb has had more than 30 years' experience in gas utility operation, starting as a cadet engineer with UGI in 1921 at the Allentown-Bethlehem Gas Co.

Clark Belden Is PR Association VP

Clark Belden, managing director of The New England Gas Association, Boston, has just been elected eastern regional vice president of the Public Relations Society of America. Mr. Belden is also a member of the Public Relations Advisory Committee of the United States Chamber of Commerce. He is president of the New England Chapter of the Public Relations Society.

Utilities Add Househeating Customers

The gas utility industry added 1,090,000 new househeating installations during the 1952-1953 heating season, American Gas Association reports. Existing restrictions on new heating installations in some areas resulted in a decline in new installations in the 1952-1953 season from new customers added in 1951-1952.

Additions made in the past season, plus corrected estimates in existing gas househeating users, brought the total number of residential heating customers served by the industry to 11,728,000, equivalent to 48% of all residential customers.

It is expected that restrictions during the next three heating seasons will be less severe as pipeline capacities and underground storage facilities continue to expand. This forecast is substantiated by the estimate made by reporting gas utilities of an additional 1,221,000 new gas househeating installations in the 1953-1954 heating season, and nearly 1.2 million more homes to receive gas househeating in each of the 1954-1955 and 1955-1956 heating seasons.

During the 1953-1954 heating season it is estimated that 53.8% of the new gas househeating installations will be located in new dwellings. In the two subsequent periods the proportions of new and existing structures will be virtually equal, the survey shows. Reports were received from 322 companies serving 22.7 million customers, and representing 93% of all residential gas customers.

Range, Heater Shipments Top 52

Shipments of automatic gas water heaters continued to climb during October, exceeding shipments for the same month of 1952

for the 17 consecutive month, according to Edward R. Martin, director of marketing and statistics, Gas Appliance Manufacturers Association.

The October total was 196,500 units, a six% increase over the units shipped during October of 1952.

Total water heater shipments during the first 10 months amounted to 1,843,300, a 17.8% gain over last year's comparable period.

Shipments of automatic gas ranges during the first 10 months of 1953 exceeded those during the 10-month period of 1952 by 4.8%. Shipments for the 10-month period amounted to 1,897,100 units.

October shipments fell below the same month of 1952 by 10%, with 215,800 units shipped.

Heavy Pipe Mill to Use Gas Equipt

A new type gas ingot-heating furnace will be used in a pipe mill being erected at Phoenix Iron and Steel Co., Phoenixville, Pa., a subsidiary of Barium Steel Corp.

A contract has been awarded to Selas Corporation of America for a 72′ overall diameter furnace, designed and equipped to heat 22″ diameter ingots of approximately 4T each to piercing temperature of 2,300°F in less than 2 hours, compared with a conventional heating time of 8 hours or more. Substantial savings in fuel requirements and in scale losses are anticipated. The unit is rated at 50T per hour to coordinate with pipe mill capacity.

The mill will be capable of producing heavy-wall, large-diameter pipe, now available only from European plants.

Another contract for the largest continuous reheating furnace line for seamless pipe, prior to sizing, has been awarded to Selas by Phoenix.

Seven in-line furnaces will be capable of continuous reheating of as large as 18″ diameter seamless tubes as they come from the piercing mill for reheating to 1,200-1,800°F before going through the sizing mill for accurate dimensioning. Temperature control equipment in the furnace line will automatically hold any underheated tube until it is at the exact predetermined temperature for entering the sizing mill.

The seven-furnace line will have automatic variable speed conveyor equipment synchronized with the pipe mill speeds.

Kinney Elected ACS Div Chairman

Dr. C. R. Kinney, professor of fuel technology at Pennsylvania State College, has been elected 1954 chairman of the American Chemical Society's division of gas and fuel chemistry. He succeeds G. D. Creelman, research director of the M. A. Hanna Co.

Plan Housing Center Gas Exhibit

Gas equipment will be displayed among home building industry exhibits in the national housing center scheduled to open in November, 1954, in Washington, D. C., American Gas Association has announced.

The center, headquarters of the National Association of Home Builders, will devote six floors mainly for permanent displays by organizations offering products to builders.

NEW EQUIPMENT

Parts cabinets

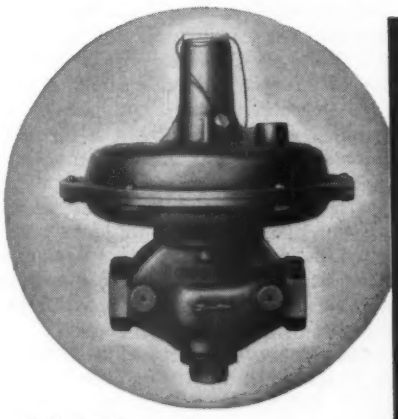
These all steel cabinets for small parts storage consist of two 1½″ high drawers in a one-piece welded frame, with an overall size of 3½″ by 11″ by 11″. Each drawer is furnished with 8 dividers, giving the cabinet a total of 24 adjustable compartments. Extra dividers can be added to make a 56 compartment unit. Any number of units may be stacked in one solid assembly. The cabinets are especially designed for insertion in the manufacturer's standard parts cabinets which consist of 18 drawers, each 11⅞″ by 5⅜″ by 3⅛″. The overall size of the standard cabinet is 34″ wide,

13¾″ high, and 12″ deep.

Little Gem Tiny Parts Cabinet and Standard Parts Cabinet. Precision Equipment Co., 3714 Milwaukee Ave., Chicago 41.

Steady

REYNOLDS LOW PRESSURE REGULATORS



PIPE SIZES:
¼″ to 8″
¼″ to 3″ with screw connections
3″ to 8″ with flange connections

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Reynolds Low Pressure Regulators guarantee steady, constant, unvarying outlet pressure even though the volume varies and inlet pressure fluctuates. Precision built and delicately balanced for accurate performance on low pressure installations, the units illustrated are backed by factory tests over a wide range of operating conditions. Reynolds Low Pressure Regulators are economical and safe. Our Engineering Department is at your service.

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Prepare for Natural Gas

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"FLUSHALL"
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"FOGALL H"
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"FOGALL C"
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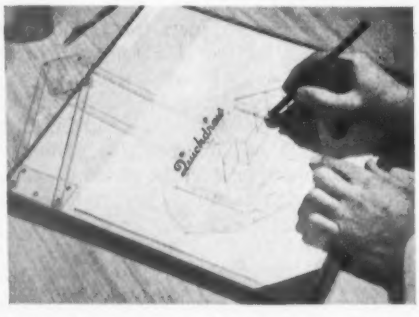
Device for simple technical drawing

This device meets a definite requirement for making simplified drawings of mechanical subjects without relying upon cumber-

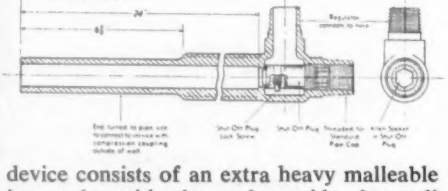


some drawing boards, separate T-square, triangles and drawing instruments. It appears to have a particular value for superintendents and executives who wish to visualize a mechanical project with sufficient basic accuracy to enable draftsmen to proceed more readily with detailed drawings and, in the cases of less extensive projects, to produce final working drawings. It is arranged as a durable portfolio with an overall size of 14″ x 14″ and can be used to produce drawings without the aid of either drafting skill or training. The portfolio consists of a plastic template that has been cut accurately to make possible the drawing of horizontal and vertical lines, desired degrees of angle and parallel lines, and 13 circles in steps from 1/16″-to-1″ in diameter. Inch and millimeter scales are provided. The template is attached to the portfolio by a pantograph, thereby eliminating the need for separate drawing tools other than a pencil. In general, the maximum size of the paper which can be used is 13″ x 10″. In a test of this device by the editorial department of AMERICAN GAS JOURNAL, isometric drawings were prepared quickly and with sufficient finish to permit their being reproduced. An interesting point discovered was the advantageous use of a ball-point pen which gave sharp, accurate lines.

The Quickdraw. The Quickdraw Company Ltd., 127 Gunnersbury Ave., London, W.3, England. Priced at £3.17 (approximately $11.00) including postage, packing and insurance.

Wall service fitting

A one piece wall service fitting reportedly designed to promote safety and economy in making services through walls, this



device consists of an extra heavy malleable iron tube with the end outside the wall turned to pipe size, to connect to the service pipe with a compression coupling. The part that passes through the wall is heavily ribbed, serving to anchor the fitting when grout is tamped around it and into the hole in the wall. Accidental extreme strain on the service line, the manufacturer reports, will thus cause it to pull off at the compression coupling rather than inside the building. The end inside the wall incorporates a branch tee and an angle valve of tamper-proof design, enabling the regulator or meter to be attached directly to the outlet of the fitting, saving a valve and thread joints. The fittings are available in ¾″, 1″ and 1¼″ pipe sizes.

Wall Service Fitting. M. B. Skinner Co., South Bend 21, Ind.

Aluminum case meter

Approximately the size of the manufacturer's Standard 1A model, this new meter reportedly was designed to meet demands

for increased domestic loads. The new unit has a cast aluminum case and weighs 13 lbs. It features a capacity of 240 cubic feet per hour—½ inch differential with 0.60 specific gravity gas. The case size and con-

1897 1953

GOODMAN
USED SINCE 1897
2" HANDLE & LOCKING SLEEVE
GAS MAIN STOPPER

PIPE STOPPERS OF ALL KINDS

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SAFETY GAS MAIN STOPPER COMPANY

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Brooklyn 17, N. Y.
Cable Address: GASTOPPER, N. Y.

nections are identical to the 1A meter and, the manufacturer states, most parts are interchangeable.

Sprague 240 Meter. The Sprague Meter Co., Bridgeport, Conn.

Mercury service regulator

Said to be a mercury seal version of the manufacturer's standard 107-1 service regulator, this new unit was designed to relieve

large volumes of gas in emergencies. The regulator, the company reports, will relieve a greater volume of gas than any other device of its type. For example, it is pointed out, the unit employing a 3/16" orifice with main valve assembly removed and 85 lbs. inlet pressure, will relieve 2,400 cf/hr with an outlet pressure buildup of less than 1 lb. Separate mercury seals adaptable to the company's 107-1, -2 and -3 service regulators already in service are also available.

Mercury Seal Service Regulator. Rockwell Mfg. Co., 400 No. Lexington Ave., Pittsburgh 8, Pa.

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WASHINGTON, D. C. JACKSON, MICH.

NEW BULLETINS

NORDSTROM MULTIPORT VALVE CHART. A handy, desk-size flexible plastic chart showing the port and stop arrangements of Nordstrom multiport valves, this chart was designed for easy reference. The front offers diagrammatical sketches of four types of mutiport valves, each with a revolving two-color plastic disc attached to the center to illustrate the fluid traffic control obtained in the various types of multiport valves. The rear of the chart illustrates, with smaller sketches, the numerous other positions possible with different multiport arrangements.

Nordstrom Multiport Valve Chart. Meter and Valve Div., Rockwell Mfg. Co., 400 No. Lexington Ave., Pittsburgh 8, Pa.

FACTORY-COORDINATED INDUSTRIAL FUEL BURNING SYSTEMS. This well illustrated, multi-colored bulletin presents the complete story about the manufacturer's factory coordinated industrial fuel burning system, describing what it is, what it means and how it operates. There are many photographs of equipment and installations, showing various oil and gas burners and factory-wired control panels. There is a chart indicating burner sizes and capacities.

Bulletin ID53-162. York-Shipley, Inc., York, Pa.

AMERICAN STANDARD REQUIREMENTS FOR INSTALLATION OF GAS CONVERSION BURNERS IN DOMESTIC RANGES. A new 40 page pocket size American Standard covering the installation of gas conversion burners in domestic ranges, this illustrated bulletin is intended as an installation guide for gas equipment installers. It outlines precautions which must be observed when installing such equipment and test methods that must be used to assure proper operation.

Pp. 39. American Gas Association Laboratories, 1032 E. 62 St., Cleveland 3. Price, $0.25 each.

PLASTIC PIPE. Instructions for the installation of flexible and rigid plastic pipe are presented in these two bulletins. They present answers to the 22 most frequently asked questions about the two types of pipe. The bulletins tell what the pipe is, how it is installed, how the price compares with that of metallic pipe and applications for which it is recommended.

Answers on Plastic Pipe. Answers on L-Pipe. Carlon Products Corp., Cleveland 5.

ECLIPSE DO SOLENOID VALVES. For use in installations requiring the control of gas, air, water or oil, the solenoid valves described in this bulletin may be activated by thermostats, hygrostats, timers, pressure switches, limit switches and other automatic control devices and by manual switches, the manufacturer reports. These valves are available in both brass and aluminum for high pressure operation up to 150 psi in pipe sizes up to ¾ inch, and aluminum valves only for low pressures to 10 psi in pipe sizes up to 1½ inches. The bulletin contains information on advantages, construction features and operation.

Bulletin M-500-T. Pp. 4. Eclipse Fuel Engineering Co., Rockford, Ill.

BLOWERS AND EXHAUSTERS. Information on centrifugal blowers and exhausters for air or gas handling is presented in this bulletin. Typical applications of the manufacturer's blowers and exhausters, available with either cast iron or fabricated steel housings, are described to indicate the variety of uses. Performance data is presented for air blowers and exhausters with cast iron housings ranging from 1 to 7 psi; air blowers and exhausters with fabricated steel housings from ½ to 3 psi; and gas blowers or boosters with cast iron housings for gas pressures from ½ lb to 6 lb, with specific gravity ranges of .55 to 1.40. Fundamental engineering laws for blower applications are given, as well as altitude and temperature correction factors, pressure equivalents, and friction loss and velocity tables.

Bulletin B-6. Pp. 32. Lamson Corp., Billmyre Blower Div., Syracuse 1, N. Y.

ALCO GAS BURNER TIPS AND HEADS. Details and specifications on these standard burner tips are given in this bulletin, together with photographs of typical designs. The burner tip reportedly will not corrode, oxidize, soot or become clogged, and will retain its shape at all temperatures up to 2,000° F. Information is given on a special order service for making burner tips and heads of whatever shape and almost any size desired. Physical characteristics are given. Includes gas burner tips, radiant burner heads, carbon black tips, pilot tips, spuds, caps, removable discs and rings.

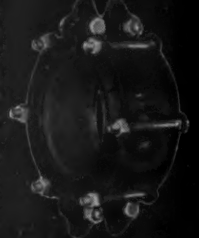
Bulletin No. 526. Pp. 4. American Lava Corp., Chattanooga 5, Tenn.

FOR REPAIRING BELL AND SPIGOT JOINT LEAKS...

SKINNER-SEAL
Bell Joint Clamp for stopping bell and spigot joint leaks under pressure. Gasket is completely sealed: at bell face by Monel Metal Seal band — at spigot by hard vulcanized gasket tip. 2" to 42".

AND BROKEN MAINS

SKINNER-SEAL
Split Coupling Clamp. One man can install in 5 to 15 minutes. Gasket sealed by Monel band. Tested to 800 lbs. line pressure. A lasting repair. 2" to 24" incl.



M. B. SKINNER CO.
SOUTH BEND 21, INDIANA, U.S.A.

How Peak Shaving Benefits Natural Gas Distribution Systems

(Continued from page 16)

The cost of propane-air plants may be divided into two parts, the storage facilities and the compressor-mixing plant. The storage facilities will vary in cost somewhat when tanks are used, depending upon the tank protection that is provided. Generally speaking, this cost will be in the range of 60-to-90 cents per gal of storage capacity or, on the basis of equivalent 1,000 Btu gas, $6.50 to $9.50 per Mcf.

Economics of cavern storage

Storage of propane in manually-excavated caverns has come into use by propane marketers in recent years. Studies of this form of storage would indicate that cavern storage of propane would be economical for anyone considering the storage of more than 250,000 gal. It is quite economical to excavate rock, and caverns made in this manner cost from 63 to 20 cents per gal of propane stored. It should also be pointed out that cavern storage is extremely safe and temperatures are essentially constant.

When it is possible to wash out salt formations for propane storage, the cost of storage can be reduced to as low as 4.5 cents per gal for a storage capacity of 50,000 bbl.

The cost of the compressor and mixing plant can, in general, be reduced to a unit cost per brake horsepower when air must be compressed. This figure ranges from $300 to $620.

The cost of propane-air, using rock cavern storage and delivering to a distribution system at 250 psig is shown in Figure 4. The sendout rate is based on the maximum per day, in this case 6% of the storage capacity. The cost approaches a minimum of about $1.90 per Mcf, and goes up to about $3 for smaller plants.

The same analysis for 50 psig sendout pressure, with a minimum cost of gas of about $1.75 for a very large plant, is given in Figure 5. The cost of gas includes fixed charges at 15%, labor, propane at 11.7 cents per gal, and utilities. Propane at 11.7 cents per gal means a cost of $1.27 per Mcf of natural gas equivalent at 1,000 Btu per scf so that these curves may be corrected for the current price of propane.

Liquefaction of natural gas is still an economical peak shaving method.

A natural gas liquefaction plant may be considered to perform three functions: liquefaction, storage and regasification.

Liquefaction is done by compressing the gas and chilling it with boiling ethylene, which in turn is compressed and chilled with boiling propane. The propane is then compressed and condensed with cooling water. Such a system is called a cascade. The cost of this portion of the plant depends on the rate set for filling storage. The size of the storage affects the size of facilities for reliquefying the vent gas. The amount of vent gas is really quite small but, when the filling of the liquefaction plant is extended over a 300-day period, the plant capacity devoted to reliquefaction of the vent gases is a fair portion of the total plant capacity. The filling time should be about this long to provide an economical plant.

Liquefied natural gas may be stored in low pressure vertical cylindrical tanks with flat bottoms and self-supporting roofs. The tanks must be heavily insulated. Double wall vessels are used with about 3′ of Foamglas insulation between the walls. The inside vessel is fabricated of Type 304 stainless steel, which has an acceptable Charpy impact test at the storage temperature of 250° F.

Any liquefaction plant which is built today should follow the recommenda-

Figure 3
LIMITS OF INTERCHANGEABILITY AND SUBSTITUTABILITY
Propane Mixes with 1,000 Btu High-Methane Natural Gas

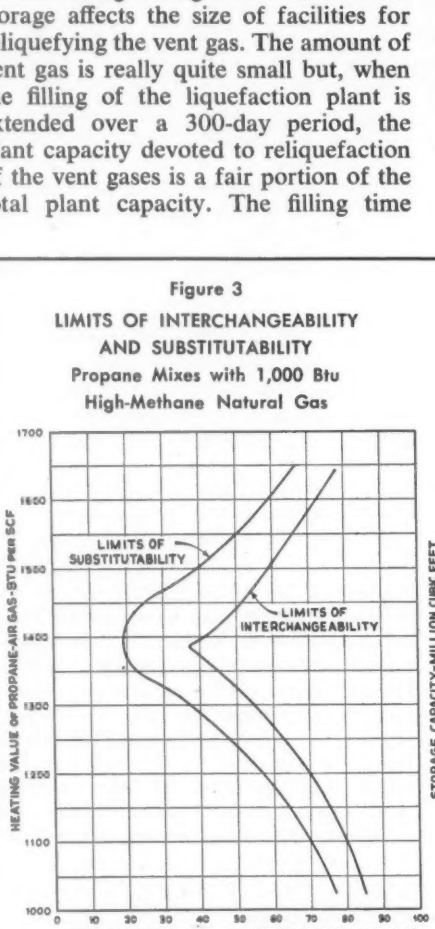

LIMITS OF SUBSTITUTABILITY
LIMITS OF INTERCHANGEABILITY
HEATING VALUE OF PROPANE-AIR GAS-BTU PER SCF
PERCENT NATURAL GAS IN FINISHED MIXTURE BY VOLUME

Figure 4
COST OF PROPANE STORAGE IN CAVERNS
With Sendout Pressure at 250 psig

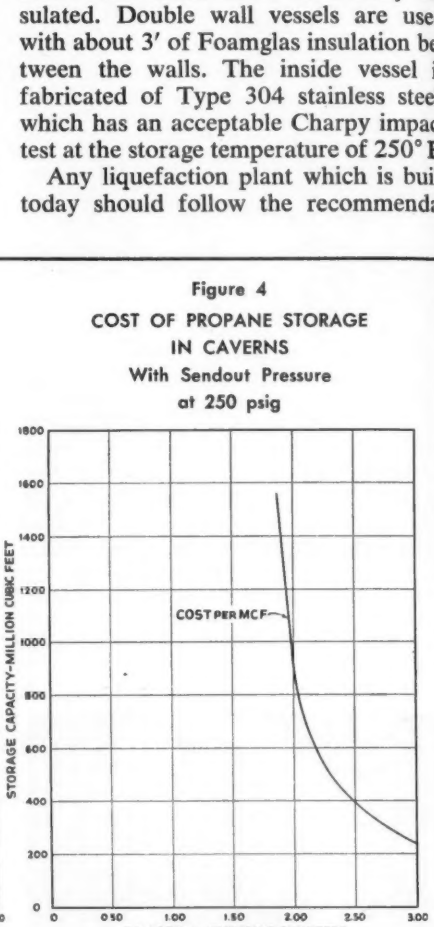


Figure 5
COST OF PROPANE STORAGE IN CAVERNS
With Sendout Pressure at 50 psig

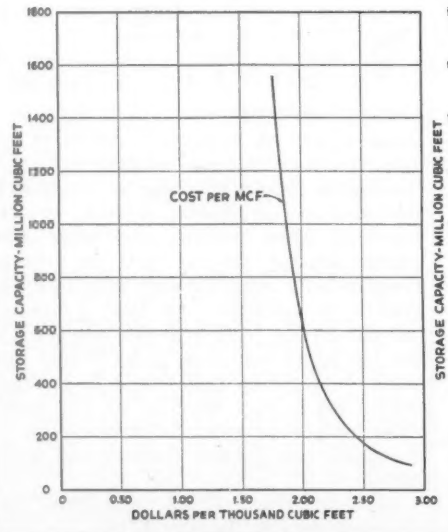
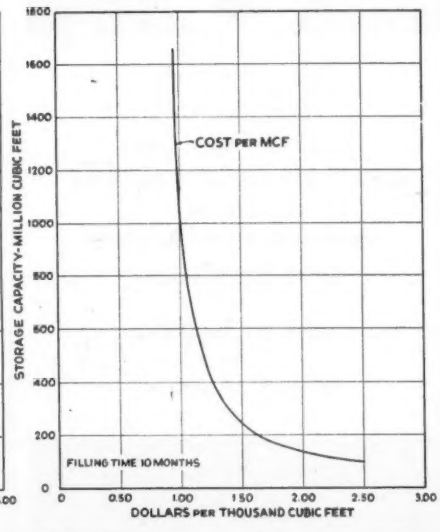


Figure 6
NATURAL GAS LIQUEFACTION
Plant Gas Costs with 10 Months Filling Time



tions of the Bureau of Mines report of Investigation 3867. This report suggests that a half mile safety perimeter be maintained around any natural gas liquefaction plant. In itself, this would restrict the installation of such plants to communities which could make such a site available. It is obvious that such a plant would not be possible near a large metropolitan area.

For a plant with a ten-month filling time, the cost of storage is about 50-to-70% of the cost of the whole plant. However, the cost is only about $5 per Mcf, or 41 cents per gal. This is very cheap, in comparison with gasholders at about $200 per Mcf. While the cost per gallon is greater than that for propane storage in caverns, it is less than propane tank storage.

There has been speculation on the feasibility of cavern storage for liquefied natural gas. The vent losses would increase several fold, but the reduced cost of storage might more than make up the difference. However, the behavior of rock under low temperatures will take a great amount of study before the responsible engineer will try it.

Regasification facilities consist basically of pumps, controls and heaters. Their cost is small compared to that of the other facilities.

Natural gas liquefaction

Considering the whole liquefaction plant, the gas costs are given in Figure 6 for plants with a filling time of ten months and a sendout time of two months. Plotted on this curve is the cost of gas, including fixed charges, labor, materials, fuel, and supplies. For a large plant, the cost of peak shaving gas would be less than $1 per Mcf and, with 140 MMcf of storage, a cost of $2 per Mcf could be obtained.

This is less than propane and gives rise to the question: "Why a propane plant?" The answer is that the capital cost is higher. $5 million will buy 700 MMcf of liquefied natural gas storage capacity as compared to 1,500 MMcf of propane storage capacity. However, the propane itself costs more money. So, if average weather peak shaving is the consideration, liquefied natural gas is the choice; if stand-by storage, or storage for severe weather is the consideration, propane is the choice.

The ideal gas storage plant is a natural geological formation. A pervious sand seal by an impervious cap of rock is desired—a played-out gas field meets this requirement.

The costs for such an installation may be divided into three parts. Compressor plant costs will be similar to those at a pipeline station, and will vary with the installed horsepower.

Storage costs will vary over a wide range with many factors influencing the final figure. For storage in depleted gas fields, the cost will probably be at a minimum. Depleted oil wells may offer another type of formation but at a higher cost than for a converted gas field.

In cases where neither of the previous two formations is available, the cost would be increased by exploration and development.

It has been reported that the investment for the Herscher underground project in Illinois [AMERICAN GAS JOURNAL, February 1953, p. 18] will be $17 million before any gas will be available for withdrawal. Since the net available storage capacity of this installation is 90 billion cf, the plant cost, including all facilities, is about 19 cents per Mcf, or 15.6 cents per Mcf without the compressor plant.

Experience gained in the Appalachian area shows that gas storage costs average 15 cents per Mcf of gas withdrawn.

Sendout facilities for such a natural formation will vary from the simplest form, with just a control valve, to an installation including dehydration, gas heating and compressor facilities. The dehydration will be necessary if there is a water drive to the storage formation.

With the low cost of gas of 15 cents per Mcf for a large installation, it becomes possible to do considerable peak shaving. Instead of running only for days, it is economical to run for weeks.

Cost comparisons

All these peak shaving gas cost data have been asembled on one chart and tied to the pipeline gas costs for Tacoma, Boston, San Francisco and Los Angeles —Figure 7. The chart shows the cost of peak shaving gas and pipeline gas for peaks, with propane at various delivery pressures and prices, liquefied natural gas and gas stored in underground formations.

It is evident from Figure 7 that Tacoma could not afford to do any peak shaving with propane-air at 50 psig, or higher, or with natural gas liquefaction. It might be that if a curve were added to this chart for propane-air at 1-to-2 psig, the Tacoma load curve would intersect this new curve indicating that peak shaving economies could be made utilizing this material.

For the Boston area it is apparent that either natural gas liquefaction or propane-air at 50 psig would be economical for loads up to about 750 MMcf for liquefaction; 250 MMcf, propane-air.

In the case of Los Angeles, the loads are of such magnitude that the pressure of the propane-air sendout makes no difference, and quantities up to 2,500 MMcf could be sent out annually for peak shaving purposes, economically.

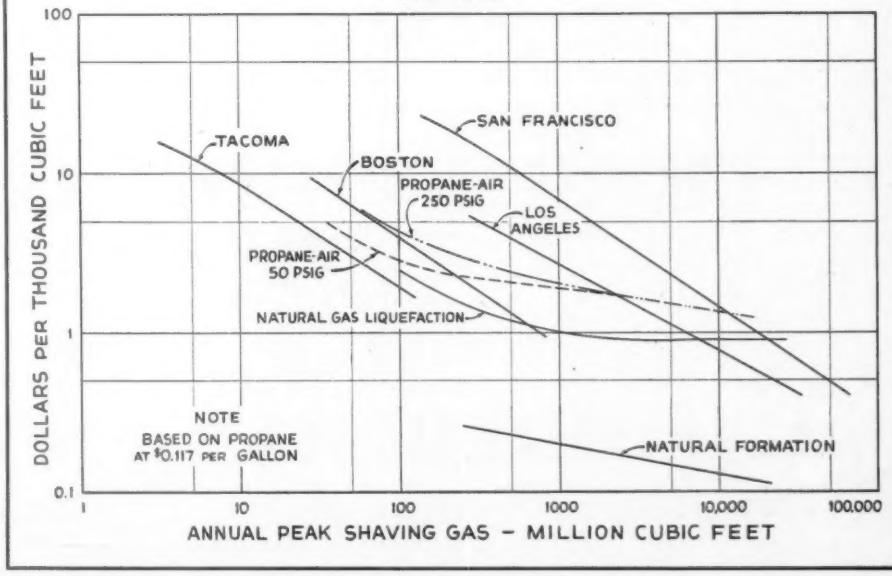
For the San Francisco area, with greater sendouts, propane-air at 50 psig or natural gas liquefaction would be economical for loads to approximately 10,000 and 25,000 MMcf respectively.

A curve for the approximate cost of gas handled for the natural underground formation has been added to the chart in Figure 7, and it is quite evident that such a formation, if it can be found, provides the most economical storage.

The curves for propane-air drawn on this chart are based on propane at 11.7 cents a gal, and the cost of the propane gas should be adjusted for the price prevailing in the specific area. This probably would have the effect of increasing the volume of sendout possible for the Los Angeles and San Francisco areas, if pro-

Figure 7

COSTS OF PEAK SHAVING GAS AND PIPELINE GAS FOR PEAKS



pane in these areas is priced at considerably less than 11.7 cents.

From these curves, propane-air is indicated for the small installation; liquefaction or underground storage, for the large peak shaving job.

Propane by pipeline

The price of propane has a great bearing on this question. In the East, Central and Northwest states, a substantial part of the cost of propane is tank car freight. It seems obvious that propane can be moved cheaper in a natural gas pipeline by injecting it in the gas on the way to the market.

Recent studies show that the cost of moving propane in this manner is 2-to-3 cents per gal per thousand miles, with an extraction cost of 2 cents per gal. That should make propane available in San Francisco at 4.5-to-6 cents per gal, shipping cost.

Approval of this method of transportation by Federal Power Commission is required before plants can be built. The pipeline companies certainly are interested in having their customers use peak shaving. It improves the pipelines' load factors; they can sell more gas.

As opposed to peak shaving by storage, there is peak shaving by cutting off industrial customers. Peak shaving allows some of this industrial load to be made firm, and the cost per Mcf of peak shaving by dropping load is arrived in:

$$C = \frac{A\,(F—D)}{P}$$

C = $/Mcf of peak gas
A = Annual Mcf of industrial gas
F = $/Mcf of firm gas
D = $/Mcf of interruptible industrial gas
P = Annual Mcf of dumped peak gas

It is assumed that the industrial gas could be sold as firm gas if a peak shaving plant were installed. This assumption might be open to debate, especially since all this gas might not be sold in Summer.

For a dump gas rate of 26 cents per Mcf and a firm gas rate of $2 per Mcf, and using dump gas to the extent of 75% of the total industrial gas, this method obtained the cost of $2.43 per Mcf for peak shaving gas. This cost is as high as peak shaving gas from a propane-air installation. In fact, if the interruptible gas volume were reduced, peak shaving by this method would be uneconomical. Conversely, if all industrial gas could be made interruptible, the cost of such peak gas would be kept to a minimum.

The higher the price that can be obtained for this interruptible gas, the lower the cost of the peak gas. The cost of industrial dump gas must be competitive with other fuels and this sets the maximum price obtainable for interruptible gas. It must also be recognized that Federal Power Commission is tending to limit natural gas to the residential and commercial market.

These are all the meat axe tools. It takes a little more skill to handle the fine points. However, there are some interesting angles. First, the rate of load-growth is important. If the load is growing rapidly, there is more use for peak shaving, because the peaks become greater each year. Also the terms of the contract are important. If an established demand is irrevocable and a natural reservoir is contemplated, it may be economical to put in temporary facilities to keep the peaks down until the reservoir is in operation. However, the situation rarely occurs where it is possible to foresee a reduction of demand or an opportunity to hold the gain to a fixed point in the future.

When a gas company is prospecting for a storage field, it is gambling for high stakes; hence, a contract which sets up irrevocable demand charges is bad for the interests of the pipeline company, because it discourages planning of future peak shaving facilities with the resulting improvement of pipeline load factor.

Other design considerations

Average weather conditions are perhaps not the correct basis for peak shaving design purposes. However, it is going to take a great amount of work to establish the correct basis. Obviously, it is weather which would balance peak shaving gains against losses and allow the desired average profit for the operation over a period of several years. Based on the experience of at least one gas company, average weather seems on the conservative side; that is, more peak shaving could be done profitably.

The method of handling design for unusually cold weather on the precise basis has not been developed because in that case the penalty of not being able to carry the load must be evaluated. The evaluation is made much easier if it is possible to cut off industrial customers, than if domestic customers were cut off. Most gas companies which can not drop industrial loads make every effort to carry their forecast load and, therefore, put in extra storage over-and-above that for average weather peak shaving.

Our weather records are only about 50 years old and probably do not give us enough information to evaluate to a nicety the chances involved. The evaluation of these risks presents a real challenge to actuarial mathematicians.

In designing for severe winters, the facilities should be chosen more from the point of view of lowest capital investment rather than from the point of view of lowest cost of peak shaving gas. A combination of plants, such as liquefied natural gas for peak shaving and propane-air for severe Winter operation, may look attractive.

A specific study requires more refined tools and a much more detailed analysis than can be made from the data given in this article. The authors hope that it throws a little more light on the general economics, and will promote consideration of peak shaving. It is an economic benefit to be shared by both distributors and suppliers of natural gas.

Adapted from a presentation to Pacific Coast Gas Association September 1953

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FIFTY YEARS OF SOUND

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GAS HOLDERS **PURIFIERS**

Gas Holder Repairs **Gas Holder Inspection**

Decisions on Rate-Making Reviewed

(Continued from page 23)

which that in question forms a part.

It thus seems that each service must provide a fair share of the total return to the gas company and incremental cost alone is not a sufficient basis. Moreover, without the firm customers demand, special facilities might never have existed.

In Springfield v. Springfield Gas & Electric Company, 125 N. E. 891, the higher court held that the fixing of gas rates is a necessity arising out of the monopoly of the public service companies. The unregulated price of service ceases to be determined by competition, except so far as some substitute for the particular service is found, if the individual consumer is unable to contract on equal terms. Fixing rates by the public service commission may secure to each individual the advantages of collective bargaining by, or in behalf of, the whole body of consumers and result in such a rate as might properly be supposed to result if free competition were possible.

Also, the higher court in the case of Railways Company v. City, 126 N. E. 585, indicated that it is within the power of the public service commission to authorize a change in gas rates without a full hearing and examination to determine the fair return on the fair value of the utility's property.

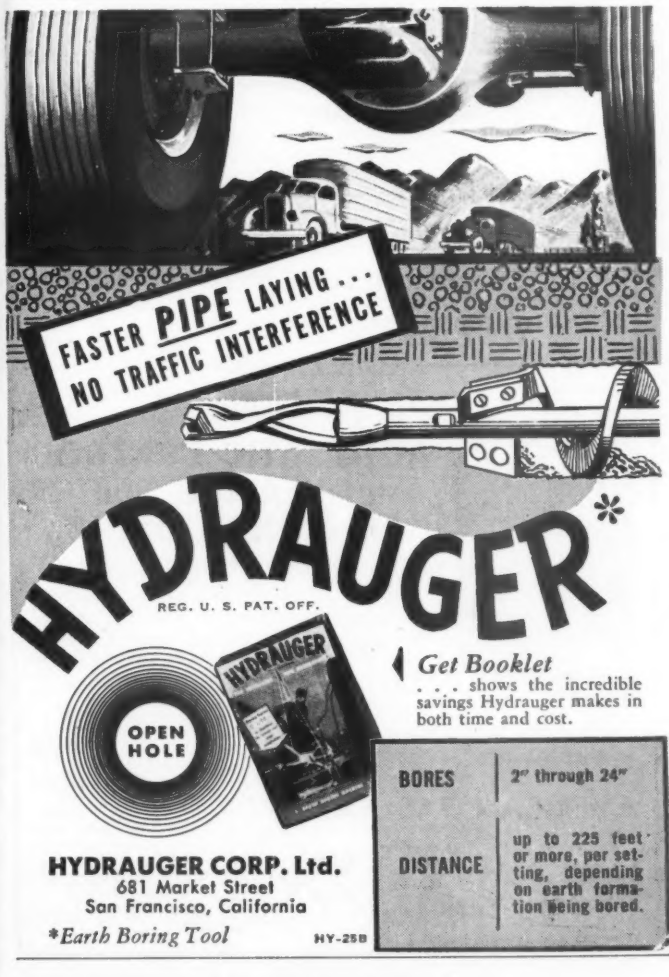
Court refuses to give opinion

Recently, a court held that although gas rates are believed to be effective because the company filed a bond, no court will uphold the rates as being valid unless, first, the commission is given an opportunity to either approve or disapprove the validity of the rates. In Atlantic Seaboard Corporation v. Federal Power Commission, 200 Fed. Rep. (2d) 108, the testimony showed: On April 10, the gas company filed tariffs with Federal Power Commission proposing changes in existing rates to be made effective May 1, 1950. These rates were suspended by the Commission, as provided by the Natural Gas Act, and did not become effective until September 1, 1951. An order reducing gas rates was entered April 25, 1952. However, the gas company, on September 7, 1951, filed new tariffs increasing the rates in controversy over those contained in the tariffs filed on April 10, 1950. These rates became effective on March 7, 1952 upon the company's filing of a bond.

The court was asked to decide several questions, including whether or not the rates which became effective March 7, 1952 were valid. The court refused to answer a majority of the questions, but held that the rates established March 7, 1952 were not valid and never became effective. The court said:

"It thus appears beyond question that the rates which we are asked to review have never become effective and that they can have no effect upon petitioners (gas company) unless the Commission in passing upon the rates filed September 7, 1951 should simply deny the increased rates asked without fixing other rates. In such event the difference between the rates which we are asked to review and the rates collected since March 7, 1952 would measure the refund which petitioners (gas company) would be required to make under the bond which they have filed."

With respect to the court's future action this court said: "We do not think that we should pass upon the important questions raised by the petition, which may turn out to have no practical significance whatever, but should remand the case to the Commission, with direction to pass upon the tariffs filed September 7, 1951, and with leave to the petitioners (gas company) to apply thereafter for review of the Commission's actions, including any matter involved in the proceeding now before us which may then be material."



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Gas Dispatchers Meet and Master Delivery Problems

(Continued from page 17)

activities of dispatching. The capabilities and the training of the personnel and its acceptance by the management seem to determine these limits.

Emergencies

The responsibility for directing all operation necessary to maintain service and correct conditions during all emergencies must be delegated to the dispatching organization.

The dispatcher on duty must, of course, be able to take over and handle an emergency until he can obtain aid from his chief or the person delegated to stand by to act during such an occasion. No two emergencies are exactly alike, therefore no definite plan of procedure can be previously outlined. However, there are certain definite functions that apply to all emergencies, and these principles may be previously outlined in manual form and distributed to all who are concerned in the handling of emergencies. It is not only necessary for the dispatcher to plan the course of procedure which will supply the markets during an emergency, but it is equally important that the system be restored to normal after the trouble has been corrected.

An experienced and well trained dispatching organization, functioning during an emergency, will attack the problem with coolness and determination. Some gas utilities operating in highly industrialized areas have adopted a civil defense program in which the dispatching organization plays an important part. In some organizations, this training has reached the point of establishing alternate dispatching offices equipped with telephone, radios, maps, forms and other equipment essential to the dispatching operations. In case of bombing or sabotage of their regular operating quarters, they have instructions to report for duty at the alternate location.

Underground storage

The use of underground storage, particularly in the Appalachian area, has made it possible to construct and operate many pipelines from the Southwest without major rate increases to the customers served.

This program has made available to the dispatcher great quantities of gas on short notice, but its dispatching to and from the storage areas has added to his year-round responsibilities.

The chief dispatcher's knowledge of the characteristics of the various pools operated by his company makes his assistance valuable in scheduling its input and withdrawal so that the greatest quantity possible may be obtained during the time of greatest demand.

Storage and standby plants

Most companies employ some type of standby facilities for peak requirements, whether it be underground, low pressure or high pressure storage, or liquefied gas. It is usually the chief dispatcher's recommendation which governs its use to best serve its limited purpose. Standby plants maintained by many gas companies, which usually have a fuel supply sufficient for only a few peak days operation, present a major problem for dispatching.

It is often necessary to choose between operation of standby facilities or resorting to industrial curtailment, thus saving the limited fuel supply for domestic requirements which may come later.

Curtailment

During the past two winters the dispatchers operating in the Appalachian area, as a result of the mild winters, have had a reprieve from the gas shortages that occurred during the war years, post war years and defense years. During those years the dispatchers were plagued with gas shortages that resulted in industrial curtailment and, in some areas, shortages to domestic users.

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notice of curtailment in order to activate their standby facilities, to reschedule their production, or prepare the plant for shutdown. It is the chief dispatcher who issues the curtailment order or furnishes the management with the information by which such action can be taken.

Since curtailment is usually the result of low temperatures, it is extremely important to have accurate weather forecasting upon which to base the course of procedure.

Adapted from a presentation to American Gas Association October 1953

Bond Market Continuing Strong

(Continued from page 26)

been placed on the record in a recent discussion of the subject by Alfred C. Middlebrook, vice president of East River Savings Bank of New York and executive vice president of Institutional Investors Mutual Fund, Inc., the agency set up by the banks for investment of their funds in equity securities.

So long as savings banks are operated according to sound banking principles, he stated, equity securities will occupy only a marginal position in their asset structure. Among equity securities, he added, preferred stocks promise the greatest degree of dividend continuity and market stability, factors which obviously are of signal importance to the savings institutions.

Long-term studies indicate, however, he added, that to make preferreds really attractive to savings banks there should be approximately a minimum of one full percent of yield return between an industrial company preferred stock and the same company's long-term bond, with the spread expanding to 1¼ percentage point in yield between utility issues. The larger spread for utility issues will be attributed largely to the relatively heavy debt and preferred stock capitalizations of utilities.

Under existing conditions, Mr. Middlebrook said, savings bank investments in equities might well be confined largely to preferred stocks. He deprecated earlier conceptions that preferreds lacked the glamor of common shares in good times and enjoyed not much, if any, more safety in declining markets. On the contrary, he said, there is little doubt that a carefully selected portfolio of preferred stocks of investment grades will afford a measure of protection greater than that to be found in common stocks and that such investments, subject to proper timing, would fulfill a constructive purpose in the equity investment program of a savings bank.

While the preferred market in recent weeks has advanced in unison with the high-grade bond market, it still offers relatively attractive investment opportunities.

A significant factor in any appraisal of the security markets is the continuance to the present of an easy money policy by the Federal Reserve Board, even though business activity is holding at a high level. The Reserve banks have continued to purchase outright a substantial volume of Treasury bills and have acquired an additional considerable amount under repurchase agreements. This maintenance of an easy money policy reflects Administration thinking that a liberal credit policy will stabilize business and keep employment and production at a high level. While it also might indicate Administration concern that this shot-in-the-arm to the economy is necessary to ward off a possible recession in business, it serves to give some assurance that the economic picture is being watched closely and to afford base for the belief that similar and perhaps stronger measures might be taken if the situation warrants.

Experienced Executives in Demand

The Forty Plus Club of New York, a cooperative non-profit organization of executives who are between jobs, issued remently an analysis of the demand for executives over forty based on their own figures. The Club, composed of about 75 currently unemployed and 3,000 employed former members, supplies industry at the rate of one executive every other day in the $7,000-$35,000 bracket. The analysis disclosed that the demand for their executive talents has been steadily on the increase, and that a 100% increase in operating efficiency had been achieved in 1953 as compared to 1952.

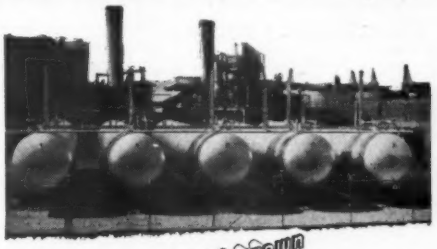
The members of the Club come from all walks of industry and include, to mention only a few, controllers and treasurers, advertising executives, economists, engineers, lawyers, personnel specialists, production managers, public relations men, editors and writers, sales managers, retail executives, and traffic managers.

There are other Forty Plus Clubs in almost every big city such as San Francisco, Los Angeles, Detroit, Chicago, Boston, Hartford, Philadelphia, Miami, Kansas City; also, in Toronto and Montreal. However, they all operate independently and are not affiliated.

A. O. Smith Acquires Subsidiary

The A. O. Smith Corp. has purchased Glascote Products, Inc., manufacturer of glass coated equipment for the chemical and chemical processing industries. The company will be operated as a subsidiary.

NATURAL GAS STANDBY



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GAS INDUSTRY CALENDAR

January, 1954

14-21 National housewares and home appliance exhibits, Navy Pier, Chicago.
17-21 National Association of Home Builders convention and exposition, Chicago.
18-20 AGA home service workshop, Deshler Hilton Hotel, Columbus, O.

February, 1954

8-12 Western winter radio-television & appliance market, Western Merchandise Mart, San Francisco.

March, 1954

4-5 AGA transmission and storage conference, Jung Hotel, New Orleans.
15-17 Mid-West Gas Association, Fort Des Moines Hotel, Des Moines, Iowa.
25-26 Oklahoma Utilities Association annual convention, Biltmore Hotel, Oklahoma City.
25-26 New England Gas Association, Hotel Statler, Boston.

April, 1954

12-14 AGA Sales Conference on Industrial and Commercial Gas, Edgewater Beach Hotel, Chicago.
13-15 Southwestern gas measurement short course, University of Oklahoma, Norman, Okla.
20-23 AGA Distribution, Motor Vehicles and Corrosion Conference, Mount Royal Hotel, Montreal, Canada.
22-23 Indiana Gas Association, annual meeting, French Lick Springs Hotel, Chicago.
26-28 Mid-West Regional Sales Conference, Edgewater Beach Hotel, Chicago.
26-28 The 1954 annual convention, Southern Gas Association, Houston.

May, 1954

10 (week) 35th Annual National Restaurant Convention and Exposition, Navy Pier, Chicago.
10 (week) AGA commercial gas school, Chicago.
10-13 LPGA Annual Convention, Conrad Hilton Hotel, Chicago.
19-21 GAMA annual meeting, The Drake, Chicago.
24-26 AGA Production and Chemical Conference, Wm. Penn Hotel, Pittsburgh.
27-28 Natural Gas and Petroleum Association of Canada, Prince Edward Hotel, Windsor, Ontario, Canada.

June, 1954

20-24 Canadian Gas Association, Banff Springs Hotel, Banff, Alberta, Canada.
28-29 Michigan Gas Association, Grand Hotel, Mackinac Island, Mich.

July, 1954

12-16 National housewares and home appliance exhibits, Auditorium, Atlantic City, N. J.
19-23 Western summer radio-television and appliance market, Western Merchandise Mart, San Francisco.

September, 1954

8-10 Pacific Coast Gas Association, Victoria, British Columbia.
28-29 Texas Mid-Continent Oil and Gas Association, Baker Hotel, Dallas.

October, 1954

11-14 AGA annual convention, Atlantic City, N. J.
18-22 National Safety Council, Chicago.

November, 1954

1-5 National Metal Exposition, Chicago.
8-11 American Petroleum Institute, Conrad Hilton Hotel, Chicago.
28-December 3 The American Society of Mechanical Engineers, Statler Hotel, New York.

February, 1955

7-11 Western winter radio-television and appliance market, Western Merchandise Mart, San Francisco.

April, 1955

12-14 AGA sales conference on Industrial and commercial gas, Hotel Statler, Boston, Mass.
25-27 Mid-West regional gas sales conference, Edgewater Beach Hotel, Chicago.

May, 1955

9-13 National restaurant exposition, Navy Pier, Chicago.
16-18 Southern Gas Association, New Orleans, La.
23-25 GAMA annual meeting, Ambassador Hotel, Los Angeles.

June, 1955

5-9 Canadian Gas Association, annual meeting, General Brock Hotel, Niagara Falls, Ontario, Canada.

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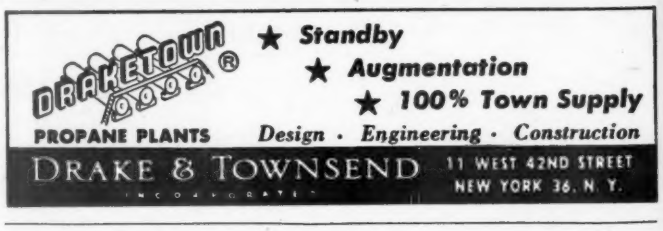

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44 Prospect Ave. — Montclair, N. J.
Phone—Montclair 2-3692

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